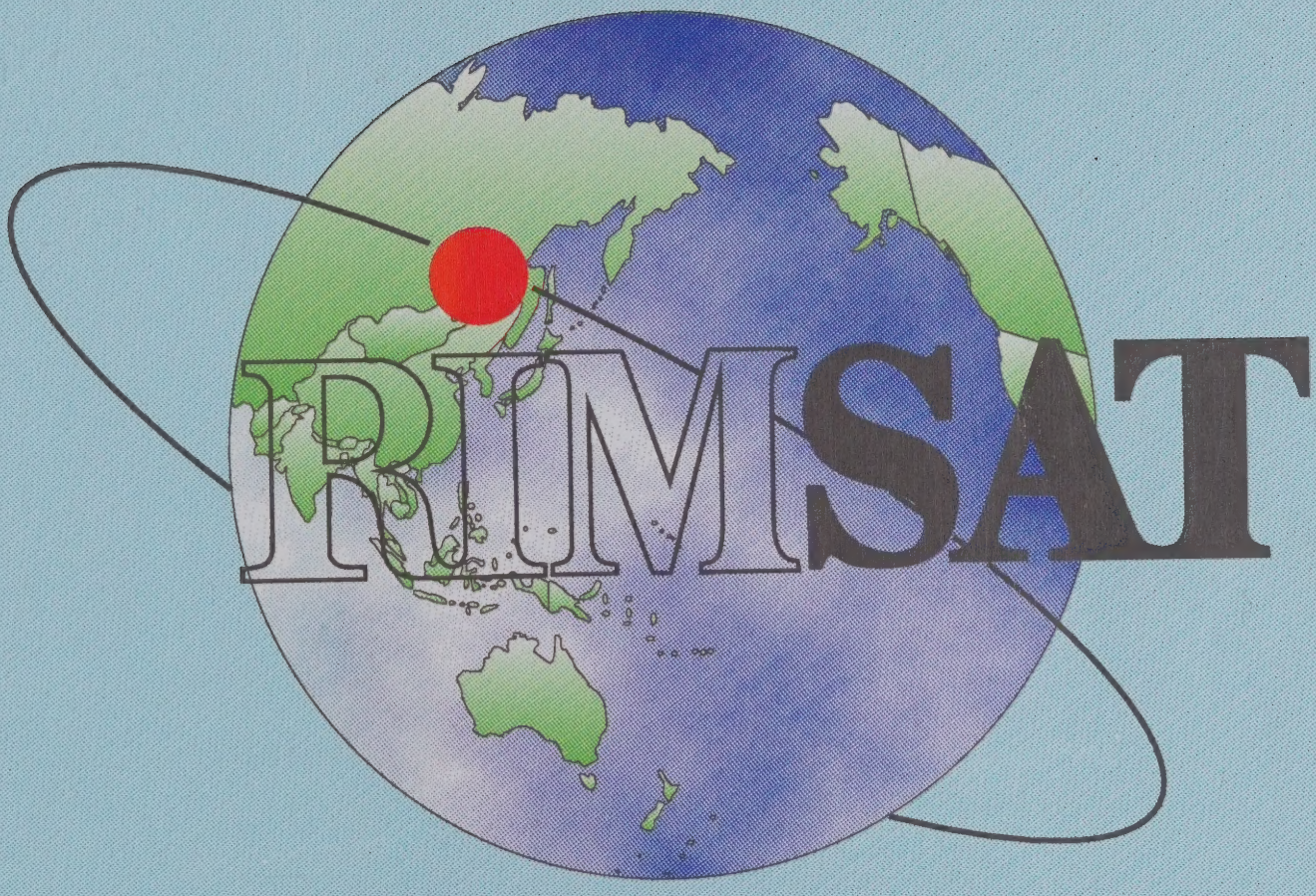
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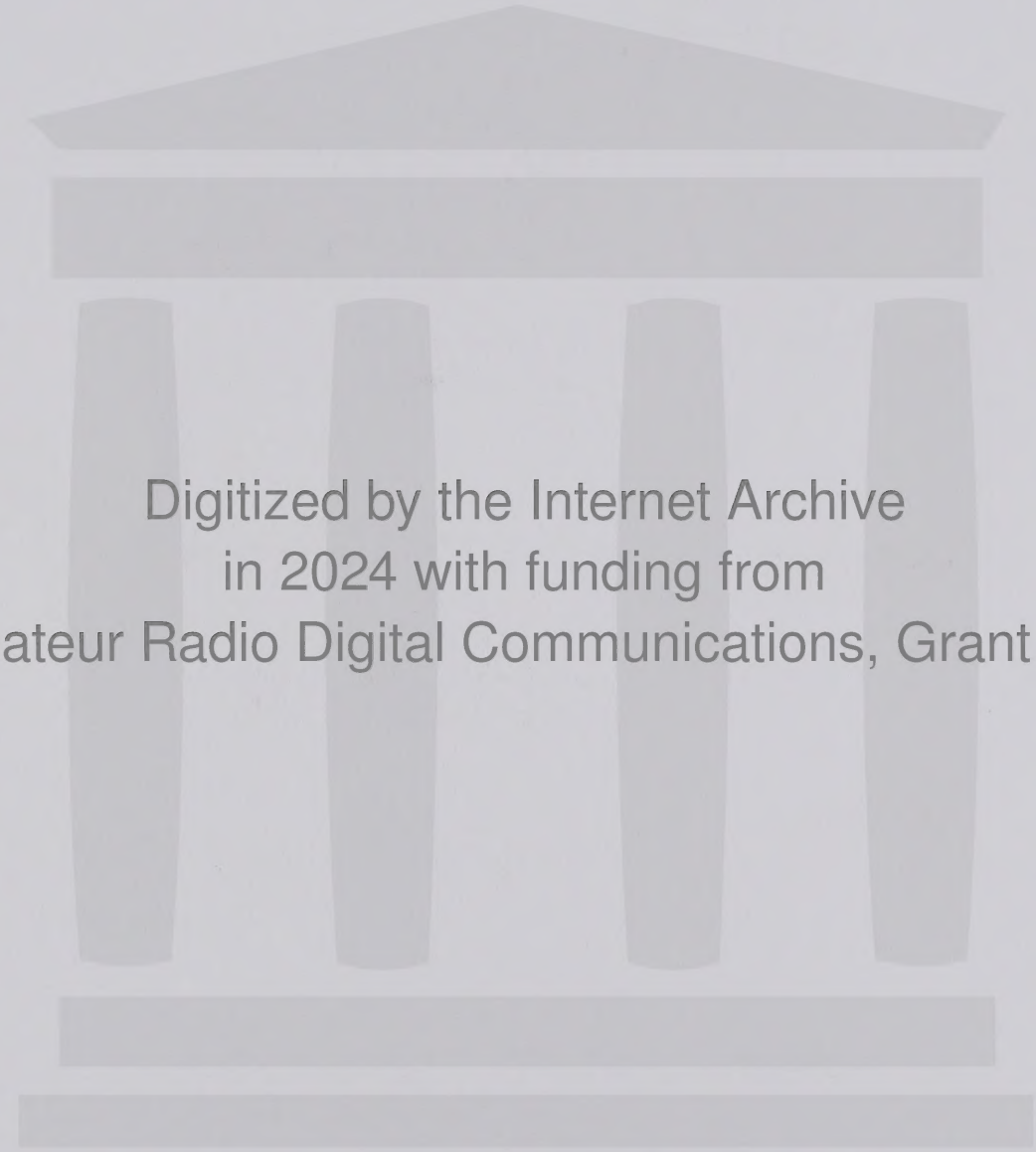
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Vice President, Network Operations

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- G-2 (142.5°) FOOTPRINTS .....
- EXPRESS SATELLITE SPECIFICATIONS .....
- EURASIA EXPRESS-1 (80°E) FOOTPRINTS ..... (Scheduled December 1994)
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RIMSAT, LTD., PROFILE

Rimsat, Ltd., is the leading supplier of low cost, highly reliable satellite broadcast, telephonic and data communication services across an area ranging from Europe to the Rocky Mountains in the United States and from the Arctic Circle to New Zealand.

Meeting the needs of customers throughout the most diverse operating region on Earth places unique requirements on Rimsat's satellites and support systems. They must meet the burgeoning demands of Asia, a thriving center of commerce supporting "a $3 trillion market growing at $3 billion a week." They must have the power to encompass two-thirds of the world's surface and serve nearly three-fourths of its population. They must have the versatility to serve many of the world's most developed economies, yet repond to the special requirements of emerging countries and their peoples.

Rimsat is proving equal to the task. As it promised when the company was established to primarily serve the people of Southeast Asia, Rimsat, Ltd., has created a satellite communication system that is powerful enough to span four continents, yet flexible enough to reach extremely small receivers in the most remote regions.

The New York Times summed up Rimsat's accomplishments during its first two years as "a victory for one of the most quixotic space ventures ever undertaken."

HISTORY

Formed in April, 1992 by a small group of visionary investors, Rimsat secured licenses to three geostationary satellite positions from the Kingdom of Tonga and its communications authority, TongaSat.

Managing Director James Simon and Chief Operating Officer Michael Sternberg immediately flew to Moscow with a team of technical experts where they successfully negotiated a (U.S.) $130 million contract governing the lease, launch and operation of *Gorizont* and Express communication satellites.

With Tongan satellite positions and Russian satellites, the American-based operating company's unique international character was significantly expanded by (U.S.) $38 million in private investment from Tajudin bin Ramli, a Malaysian investor headquartered in Kuala Lumpur.

OPERATIONS

In accord with its agreement, Russia repositioned an existing Gorizont satellite to Rimsat's slot at 134° East during the early Summer, 1993 (see accompanying map). After operational testing, Sun TV, Madras, India, inaugurated Rimsat's commercial service in August, 1993, less than 18 months after Rimsat signed the agreement with Russia.

Three months later, the company truly came of age with the November 1993 launch of a new, upgraded Gorizont (i.e., Horizon) satellite from the Baikinour Cosmodrome, Kazakhstan to Rimsat's 130° East position. Sun TV, AsiaNet, both of Madras, and InterSputnik, headquartered in Moscow, fully leased that satellite's transponders by April 1994.

The third in the seven-transponder *Gorizont* series was launched into geosynchronous orbit over Malaysia (142.5° East) in May, 1994, with AllAsia Sat, Manila, as its first customer.

FUTURE OPERATIONS

Rimsat will begin operating the first of its larger and more versatile Express series in the Fall of 1994 from positions over the Indian and Pacific Oceans. Carrying ten high powered C-band and two Ku-band transponders, Rimsat's Express satellites are being specifically configured to meet the needs of customers in the Pacific Operating Region.

ENGINEERING SERVICES

Rimsat provides a full complement of technical assistance and engineering services to ensure customers of maximum reliability and performance. As required, Rimsat also assists in the design and development of ground station facilities.

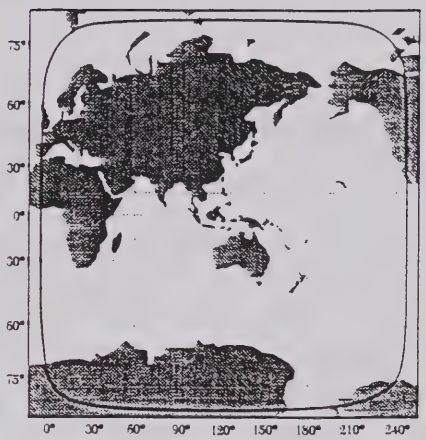
Consultation and engineering support begins with extensive examination of customer requirements and specification of satellite capabilities to meet each customer's unique operational needs. Specifications are then converted into performance standards built into the next scheduled satellite.

Once orbit is achieved, Rimsat assists customers in monitoring actual performance during the life of the contract from its earth station near Manila.

RIMSAT FACT SHEET

Principal Business

Provides low cost satellite communication services covering Asia, all Pacific Ocean countries and the Western United States via Hawaii.



RIMSAT SERVICE AREA

Demand For Service

As the fastest growing economic region in the world, demand for data, broadcast and telephonic satellite communication services will exceed capacity for the foreseeable future. The International Telecommunications Union estimates there will be a need for 100,000 additional circuits in Rimsat's service area in 1994.

Background

A Nevis, West Indies corporation, Rimsat was founded in April 1992. • Licenses with the Kingdom of Tonga allocate orbital positions (slots) at 70° East, 130° East, 134° East, 142.5° East and 170.75° East to Rimsat for 30 years. • A (U.S.) $130 million agreement with Informcosmos, under Russian Space Agency license, provides three Gorizont and four Express satellites, with options on ten additional spacecraft. The historic agreement represents the first significant contract between a Western company and the Russian space industry.

Operations

Commercial operations began in September 1993 using an existing Gorizont repositioned to 134° East in August 1993. Rimsat launched a dedicated Gorizont (Rimsat I) to geosynchronous orbit at 130° East on November 18, 1993. Satellites are launched from Baikinour, Kazakhstan and controlled from facilities near Moscow.

Launch Schedule

Rimsat's third Gorizont (Rimsat II) is scheduled for launch in April 1994, followed by more powerful Express satellites in October 1994 (Rimsat III), June 1995 (Rimsat IV), early 1996 (Rimsat V) and late 1996 (Rimsat VI).

Satellite Configurations

Each Gorizont carries one Ku-band and six C-band transponders, including an extremely high powered C-band transponder. Express satellites carry ten C-band and two Ku-band transponders.

Officers

James Simon, 43, Managing Director. Michael A. Sternberg, 47, chief operating officer.

Corporate Headquarters

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THE KINGDOM OF TONGA

The following background information has been supplied by The Kingdom of Tonga.

The Kingdom of Tonga, comprised of 173 islands located northeast of Australia, is a sovereign monarchy dating back to the fifth century B.C. It is a member of many international organizations, such as specialized agencies of the United Nations. As a member of the International Telecommunications Union (ITU), Tonga holds exclusive rights to seven geosynchronous orbital positions under International Convention. The Kingdom's exclusive agent, TongaSat, has licensed five of those orbital positions to Rimsat, Ltd., which is headquartered in Fort Wayne, Indiana.

The Kingdom of Tonga, named The Friendly Islands by Captain Cook, has an elected Parliament, an independent judiciary, and an executive consisting of a cabinet chaired by the Prime Minister and privy council, and presided over by His Majesty King Taufa'ahua Tupou IV. His Royal Highness Crown Prince Tupouto'a serves as Minister of Foreign Affairs. Her Royal Highness Princess Salote - Pilolevu Tuita serves as chairperson of TongaSat's Board of Directors. His Excellency Mr. Sione Kite, Ambassador of Tonga, is responsible for coordinating satellite communication operations with other countries.

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THE RUSSIAN SPACE AGENCY

The following background information has been supplied by The Russian Space Agency.

The Russian Space Agency (RKA) is an agency of federal executive power. It is engaged in the development and implementation of state policy regarding the exploration and use of space, as well as providing control of entities and enterprises implementing the federal space program. RKA is the State buyer of space systems, complexes and the means by which the State fulfills its scientific and economic purposes.

RKA has the authority to create space systems stock; develop the experimental, test and production facilities for the development of rocket and space capabilities; expand fundamental investigatios by applied researc hers into space science and techniques; oversee international cooperation; develop space activity on a commercial basis; and provide for the entry of Russian rocket-space techniques, services and technologies on the world market.

Licensing by RKA defines the operation of state enterprises and supports enterprises in space communication. This work also governs actions in space, eliminates accidents and provides effective inspection of Russian businessmen and enterprises regarding international treaties and agreements in the field of space.

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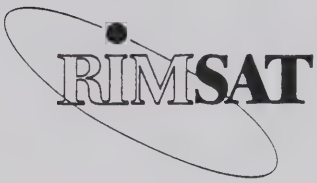

SATELLITES, LAUNCH VEHICLE & FACILITIES

Satellite Production

Rimsat acquires its satellites from NPO Prikladnoy Mekhaniki (NPO PM), the largest satellite producer in the world. Responsible for successfully placing more than 600 satellites into operations since 1975, NPO PM's record and proven reliability is unmatched by any satellite manufacturer. Satellite design and production takes place in Krasnoyarsk-26, once the secret center of Russia's military satellite capabilities.

Proton SL-12

Today's four-stage Proton launch vehicle evolved from a two-stage version introduced in 1965. Weighing 674 metric tons and approximately 57.7 meters long with payload attached, the SL-12 Proton used to launch Rimsat's satellites can carry 2500 kilograms into Earth orbit with a better than 95 percent success record.

Each of the six RD-253 engines in Proton's first stage develop 1474 kN of thrust, for a total of 8844 kN. The four engines in the second stage produce a total thrust of 2332 kN. The third stage's liquid propellant engine creates 583 kN of thrust. The fourth stage produces about 85 kN of thrust. It is used to kick the payload into orbit.

The Proton was Russia's most powerful launch vehicle until the introduction of the Energia. It is the first Russian rocket specifically designed as a launch vehicle, rather than derived from a military rocket.

Baikonur Cosmodrome (aka, Tyuratam)

One of the world's most renown space centers, the Baikonur Cosmodrome is located 2,100 kilometers southeast of Moscow near Leninsk, Kazakhstan. The 1,560 sq. km. complex houses test, assembly, launch and telemetry facilities. Currently, two launch pads are available for Proton launches.

Under an agreement signed in March 1994, Russia will continue to operate the facility under a long-term lease signed with the now independent State of Kazakhstan.

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RIMSAT

GORIZONT COMMUNICATION SATELLITE

History	Gorizont's flawless 15-year performance record makes it a highly desirable choice for communication systems demanding versatility, reliability and transmission strength tailored to specific needs. Since first launched on December 19, 1978, Gorizonts have served as the backbone of Russia's worldwide satellite telephone and television systems, carried TV coverage of the Winter Olympics, and served as the satellite communications link for the US/Russia hotline.
Transponders	Six C-band, one Ku-band, and one L-band. In addition to five 15 Watt C-band transponders, the Gorizont carries one extremely high power transponder (75 W).
Antennas	Each of Gorizont's ten antennas are pre-positioned to provide maximum transmission performance from specific orbital positions, with one antenna dedicated to each spot, zonal, hemispheric or global beam.
Power	Twin solar arrays with two major and two minor panels each generate more than 2 kW. Batteries provide power during solar eclipse.
Stabilization	3-axis stabilized. East/west station keeping is maintained to within ±.2°.
Life span	Warranted life is three years; however, actual performance indicates the Gorizont will operate five or more years with no significant decrease in its capabilities.
Length	5.45 x 3.3 x 9.46 meters
Diameter	2 meters
Weight	2,200 kg in orbit mass
Production	NPO Prikladnoy Mekhaniki (i.e., Applied Mechanics); Krasnoyarsk-26, Russia

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MANAGEMENT PROFILE

Executive Officers

Name	*Age*	*Position with Company*
James A. Simon	43	Managing Director
Michael A. Sternberg	49	Chief Operating Officer
Edmund Habib	67	Vice President- Engineering
Kathleen Woodward	39	Treasurer and Secretary

James A. Simon, Managing Director

Mr. Simon founded Rimsat and has been its managing director since May 1992.

A certified public accountant, Mr. Simon was a private practitioner (1973-1975) and an assistant professor of accounting and finance at St. Francis College, Ft. Wayne, Indiana (1975-1979). He then joined Citizens Cable Communications, Ft. Wayne, as vice president and chief financial officer. Later becoming Citizens Cable's general manager, Mr. Simon oversaw its development from 3,000 to 45,000 subscribers.

He resigned in 1985 and founded several businesses, including Fort Wayne Telsat, Inc., the first 100 watt wireless cable system in the United States.

Mr. Simon holds a Bachelors of Science in Business Administration from Manchester College and a Master of Business Administration from Ball State University.

Michael A. Sternberg, Chief Operating Officer

Michael Sternberg has served as Rimsat's chief operating officer since May 1992.

After three years as a military intelligence officer in Vietnam (1965-1968), Mr. Sternberg co-founded National Telephone Company, Hartford, Connecticut, one of the first public companies in the telephone interconnect business. In 1975, Mr. Sternberg became vice-president of marketing and sales for Oki Electronics of America, Fort Lauderdale, Florida. In 1979, Mr. Sternberg joined General Dynamics Communications, St. Louis, a large PBX and communications system vendor.

He became vice-president of marketing and corporate development for CIT-Alcatel, Inc., Reston, Virginia, a multi-billion dollar telecommunications manufacturer and a world leader in digital central office switching technology. In 1986, Mr. Sternberg became president of Stantel Telecommunication, Inc., Falls Church, Virginia, a world leader in telecommunication transmission systems. His special responsibilities included market strategies, targeting markets and customers, and developing distribution strategies.

Stantel Telecommunications was sold in 1988, at which time Mr. Sternberg was employed by Summa Four, Inc., Manchester, New Hampshire, to develop digital switching equipment. From January 1988 to March 1990, Mr. Sternberg served as senior vice president in charge of sales and marketing for Metropolitan Fiber Systems, Inc., Oakbrook Terrace, Illinois, a company engaged in the local access bypass industry utilizing advanced fiber optic transmission systems.

continued

From March 1990 to April 1992, Mr. Sternberg served as a consultant, specializing in telecommunications and end-user companies, with special emphasis on the improvement of operating results by gaining access to new markets.

Mr. Sternberg holds a Bachelors of Science degree (1963) from Hofstra College, with course concentrations in physics.

Edmund Habib, Vice President - Engineering

Mr. Habib has played a central role in telecommunications engineering since 1950 when he rose to Branch Head on the Vanguard Project — the United States' first satellite endeavor — conducted under the auspices of the United States Naval Research Laboratory.

In 1958, Mr. Habib began a 14-year tenure with the Goddard Space Flight Center. His leadership in developing the U.S. National Aeronautics and Space Administration's (NASA) Tracking and Data Relay Satellite System earned the American Institute of Aeronautics and Astronautics Communication Medal.

In 1972, Mr. Habib moved to NASA's headquarters to lead its advanced communications concept development, and serve as a special Congressional committee staff member evaluating United States electronic countermeasures capabilities.

From 1974 to 1977, Mr. Habib served as manager of Advanced Concepts and Development at Comsat. He then spent 5 years as the assistant vice president of systems engineering and implementation at American Satellite Company. In 1982, he became vice president of engineering for the consulting engineering subsidiary of Satellite Systems Engineering and oversaw a pilot direct broadcast satellite project for Direct Broadcast Satellite Corp.

In 1984, Mr. Habib joined Fairchild Communication and Electronics Company as a vice president responsible for developing communications technologies and implementing services offered to large customers. In 1986, Fairchild elected him president of its Transmission Systems Division, which provided complete earth station installations to users.

In 1987, Mr. Habib joined SRA in Arlington, Virginia where he developed communications systems for the Department of State. In 1989, he became the technical director of SATELESPACIO, a Madrid, Spain-based company. He moved to Telefonica Sistemis, Madrid, in 1991 where he worked on satellite ground station design and implementation. In 1991, he rejoined Fairchild as the senior director of its communications satellite engineering department.

Mr. Habib holds a Bachelors of Science in Electrical Engineering awarded in 1949 by the Catholic University of America.

continued

RIMSAT

Kathleen Woodward, Secretary and Treasurer

Kathleen Woodward has been Secretary and Treasurer since 1993.

Prior to Ms. Woodward joining Rimsat, the governor of Alabama appointed her to serve as administrative division chief of the Alabama Department of Economic and Community Affairs from July 1990 to May 1993. Ms. Woodward's responsibilities included overseeing a $160 million budget and the management of 80 employees involved in accounting, budgeting and related legal matters.

Prior to serving the State of Alabama, Ms. Woodward was a financial/strategic planning analyst for Dana Corporation, where she was involved in mergers and acquisitions, financial strategy, marketing, and competitive strategy. She was promoted to that position from Diamond Savings & Loan Co., a subsidiary of Dana, where she worked from 1987 to 1989 as a financial analyst assigned to special projects.

Ms. Woodward received her Bachelor of Science Degree-HEC from Ohio State University in 1976. She received a Master of Business Administration from Bowling Green University in 1990.

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INFORMCOSMOS STOCK COMPANY

The following background information has been supplied by Informcosmos.

Purpose

The Russian Ministry of Communication, in cooperation with the appropriate scientific and industrial organizations, has created a formal plan, Russia, covering development of economically feasible satellites to upgrade the nation's satellite communications and make its space systems competitive. When State budget funds were reduced, the Russia program only could be implemented through attracting investment from domestic commercial entities, regions, organizations, and foreign investors. It operates under licenses issued by the Ministry of Communication and the Russian Space Agency.

Organization

Informcosmos was established in 1991 as an association of leading enterprises specializing in the design, development, production and operation of space communication systems. In accordance with Russian law, the association was reorganized into the Informcosmos Stock Company in 1993.

Operations

Ten Gorizont and two Ekran-M satellites currently provide Russia's civilian satellite communications. Designed in the 1970s, these satellites have a limited service life and transmitting capacity. Informcosmos is beginning to replace these satellites with an orbital constellation of new Express and Gals communications satellites.

On January 20, 1994, the first Gals television broadcast satellite was launched into geostationary orbit. A contract for the use of that satellite's three transponders has been signed with the International Organization of Space Communications (Intersputnik), according to I.S. Tsyrlin, general director of Informcosmos.

The transmitting capacity of an Express is three to four times greater than a Gorizont, and its guaranteed useful life is five to eight years. The first Express satellite is scheduled to be launched this year.

Informcosmos also is responsible for the Marafon program. It provides for satellite communication with mobile and remote receivers through five Arkos satellites in geostationary orbit and four Mayak spacecraft in high elliptical orbit. Informcosmos plans to have the Marafon system operational in 1995-1996.

continued

Financing

Informcosmos initial operations were funded through loans. Currently, the main financial support for its activities are contracts with Intersputnik and an American company, Rimsat, Ltd.

Under the Rimsat contract, Informcosmos launches Gorizont and Express satellites into orbital slots that belong to the Kingdom of Tonga. The first Gorizont was shifted to the 134° East position in 1993. In November 1993, Informcosmos launched Rimsat's new Gorizont satellite to 130° East. The third Gorizont was launched on May 20, 1994 to 142.5° East.

According to the long-term agreement concluded between A/O Informcosmos and Rimsat, Informcosmos also will launch four Express satellites: two of them will occupy new slots and the other two will replace the operational Gorizonts. The value of the contract is more than 100 million U.S. dollars.

The Scientific And Production Association of Applied Mechanics (NPO PM)

NPO PM is Russia's foremost specialist in the design, development and production of communication satellites, navigation and geodectic satellites. NPO PM was founded in 1959 as a subsidiary of OKB-1 led by S.P. Korelev. It is located in Krasnoyarsk-26.

During the past 35 years, NPO PM has completed about 30 space programs, including the creation of:

- Molinia-1, Molinia-2, Molinia-3, Raduga, Raduga-1, Gorizont, Ekran, Ekran-M, Luch and Radio communication satellites;
- Tsikada and Clonass navigation satellites;
- Geo-1K and Etalon geodetic satellites;
- Deep Space Probe and Ionospheric Station scientific satellites.

Gals, Express, Arkos, Conets, Sovcanstar and Mayak space communication satellites are among the new NPO PM projects.

NPO PM, which employs highly skilled specialists in space engineering, is able to provide project management, design of satellites and satellite systems, production, testing, launch preparation and control of the satellites in orbit.

The Russian Scientific and Research Institute of Space Instrumentation

The Russian Scientific and Research Institute of Space Instrumentation is a leading organization in the development, design and production of instruments and equipment for space systems. These systems are used to explore the Earth's natural resources, evaluate the environment, locate ships and planes that have met with disaster, as well as explore the solar system, planets and the moon. It also produces instrumentation for satellite communication, navigation and geodetic systems; ground and on board systems for human space flights; and automatic systems for controlling spacecraft flight.

continued

RIMSAT

The Scientific and Research Radio Institute

The Scientific and Radio Research Radio Institute (NIIR) is the part of the Ministry of Communication in Russia. The institute designs and creates satellite communication systems, TV and sound broadcast systems, and radio relay lines. At present, NIIR specialists are creating communication systems for the Express satellite, television broadcast systems for the Gals satellite, and are developing transponders and ground station equipment.

The State Enterprise Space Communications

The State Enterprise Space Communications is part of the Ministry of Communication specializing in the operation and effective control of domestic and international space communications systems. It has four large space communications centers for the operation of the satellite communication networks that provide phone and facsimile communications, TV and radio broadcast, and electronic transmission of newspaper layouts throughout the country and the world via domestic and foreign communication satellites.

The International Commercial Stock Bank Vostock

The International Commercial Stock Bank Vostok has wide contacts with correspondent banks in the United States, Finland, Germany, Switzerland and Israel. The banks' operations are audited by the well known company, Arthur Andersen. In 1992, Vostock was included in the Eurokard-MasterCard association—one of the leading cheque payment systems in Europe. The bank provides services to more than 10,000 enterprises through more than 70 subsidiaries situated in the most important economic regions of the country.

A/O Informcosmos Capabilities

A/O Informcosmos capabilities include the development of:

- Telephone, fax, telex, video-conference, and similar systems in Russia and other areas, including the northern regions, and with areas affected by natural disasters and emergencies;
- Regional multi-program TV and stereo radio broadcast systems facilitating both collective and individual receiving;
- Satellite systems for exchanging computer data, such as bank transactions, electronic stock exchange communication and different types of monitoring;
- Global, zonal, regional, and departmental satellite communication networks consisting of small ground stations, including mobile and remote stations.

In addition:

- The lease and operation of communication and broadcast satellites and/or transponders on a temporary or long-term basis for domestic and foreign clients.

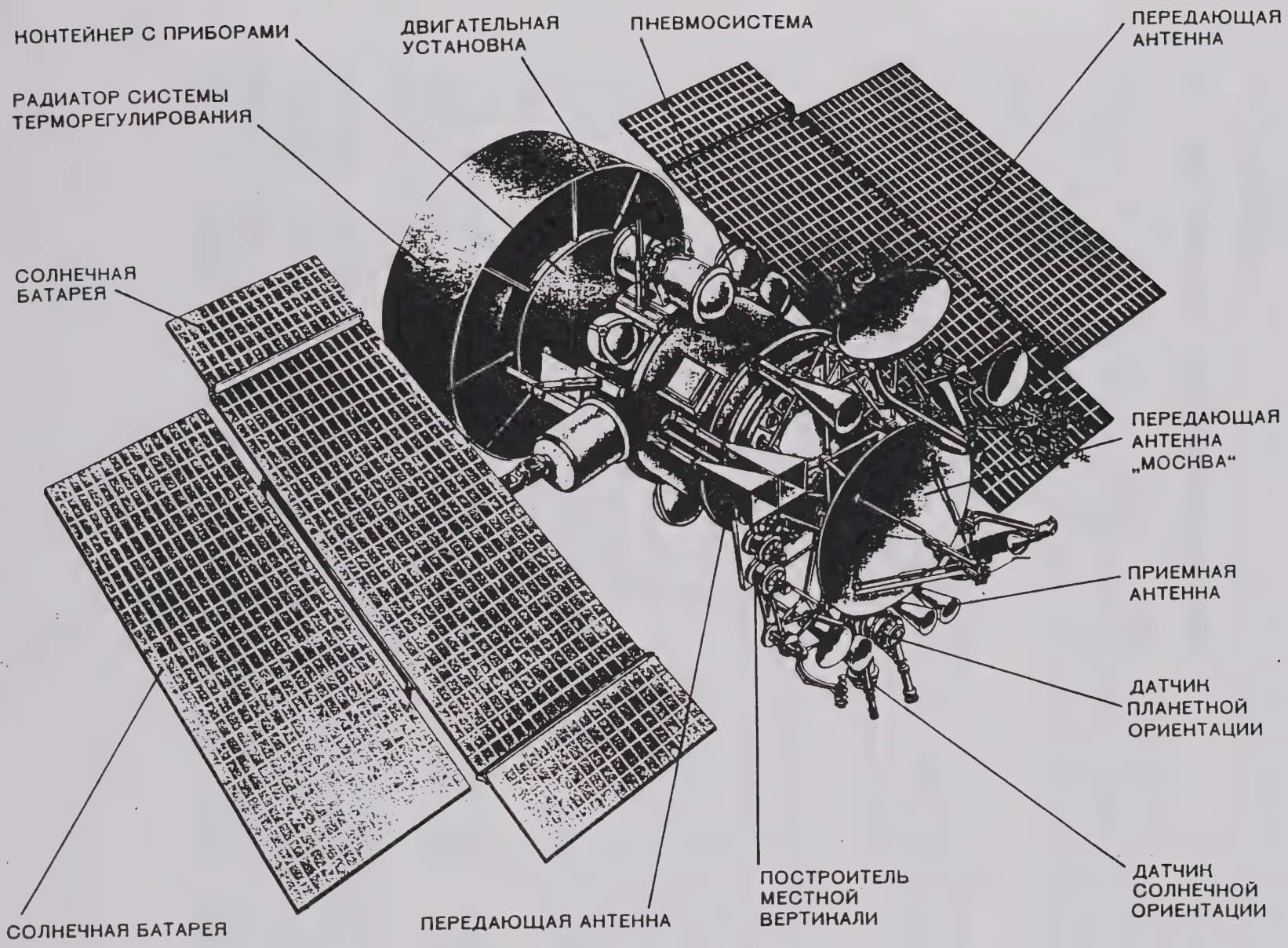
continued

Communication and TV Broadcast Systems of A/O Informcosmos

- Express, Arkos and Mayak communication satellites and the Gals TV broadcast satellite;
- Ground station networks
- Satellite communication systems' communication channel control centers;
- Centers for transmitting TV programs to the Gals satellites;
- Spacecraft control centers.

RIMSAT SYSTEM DESCRIPTION

GORIZONT SATELLITE


КОНТЕЙНЕР С ПРИБОРАМИ
ДВИГАТЕЛЬНАЯ УСТАНОВКА
ПНЕВМОСИСТЕМА
ПЕРЕДАЮЩАЯ АНТЕННА
РАДИАТОР СИСТЕМЫ ТЕРМОРЕГУЛИРОВАНИЯ
СОЛНЕЧНАЯ БАТАРЕЯ
ПЕРЕДАЮЩАЯ АНТЕННА „МОСКВА“
ПРИЕМНАЯ АНТЕННА
ДАТЧИК ПЛАНЕТНОЙ ОРИЕНТАЦИИ
ДАТЧИК СОЛНЕЧНОЙ ОРИЕНТАЦИИ
ПОСТРОИТЕЛЬ МЕСТНОЙ ВЕРТИКАЛИ
ПЕРЕДАЮЩАЯ АНТЕННА
СОЛНЕЧНАЯ БАТАРЕЯ

1.0 SUMMARY

1.1 THE GORIZONT AND EXPRESS SATELLITES

This report describes the Rimsat Gorizont and Express spacecraft, which will provide service in the Pacific region using Tonga geostationary spacecraft locations of 130, 134 and 142.5 degrees East. The satellites offer a combination of high power and wide coverage transponders at C band, and also carry Ku band transponders to meet the full range of customer requirements.

The Gorizont and Express are telecommunications satellites providing a complete array of telecommunications services, including high-power video, voice, and data, from geostationary orbit. The Gorizont has 6 C band transponders, and 1 L and 1 Ku band transponder. The Express carries 10 C band and 2 Ku band transponders.

The Gorizont and Express are both launched by a Proton launch vehicle, which has a highly reliable performance record. The launch sequence places either type of satellite into a nominal geostationary orbit. The orbit is immediately circularized, and a period selected above or below the perfectly synchronous orbit so that the satellite will move to the desired orbital location. On reaching its service location a final orbit correction is made to stabilize the satellite orbit as completely synchronous. The same propulsion system then maintains the longitude of the spacecraft throughout its service life. The Gorizont at initial deployment has approximately -1.5° inclination, which changes to positive inclination at the rate of about .85° per year. The Express in contrast is operated in an inclination-controlled mode from launch.

The Gorizont and the Express are each 3-axis stabilized satellites with the solar panels tracking the sun. Storage batteries provide operation during solar eclipse. Thermal control is provided during both normal and eclipse operation.

Spacecraft operation is autonomous. Telemetry, tracking and control (TT&C) information is recorded on-board the satellite and transmitted to the ground on command every 10 to 30 days. However, changes out of normal preset operating limits cause immediate alerting of ground control. This TT&C information comprises spacecraft housekeeping data, transponder and switching status, and orbital tracking information. A number of telemetry, command and monitoring stations are used, thus providing redundant

monitoring capability. These stations provide command and control of the spacecraft bus and configuration and control of the spacecraft payload.

For the Gorizont, some reconfiguration of connections between antennas and transponders can be accomplished after launch, during the satellite's in-orbit service life. For example, the high power transmitter in transponder number 6 can be connected to either the spot or global beam. Transmissions from transponders 7, 9 and 11 may be switched as a group to either a global or zone beam. With the Express, more extensive in-orbit reconfiguration can be accomplished.

The principal spacecraft characteristics are outlined in Table 1.1 and Table 1.2 below.

Table 1.1 GORIZONT And EXPRESS Principal Characteristics

Characteristic	Gorizont	Express
Transponders	6 C, 1 Ku	10 C, 2 Ku
In orbit mass	2200 kg	2500 kg
Overall Dimensions	5.45 x 3.3 x 9.46 m	6.10 x 3.6 x 21.0 m
Initial Propellant	68 kg bipropellant	25.5 kg hydrazine 56 kg xenon
Primary Power	1280 W EOL	2400 W EOL
Eclipse Operation	Full	Full
Warranty Life	3 years	5 years
Service Life	3-5 years	5-7 years
Orientation	±0.2°	±0.1°
Longitude	±0.2°	±0.1°
Latitude	-1.5° at BOL, +1.5° at EOL	±0.1°

Table 1.2 GORIZONT and EXPRESS C and Ku Band Frequencies and Transponders

Satellite	Transponder Number	Band	Receive Center Frequency (MHz)	Transmit Center Frequency (MHz)	Nominal Transponder Bandwidth (MHz)
Gorizont and Express	6	C	6000	3675	40
	7	C	6050	3725	38
	8	C	6100	3775	38
	9	C	6150	3825	38
	10	C	6200	3875	38
	11	C	6250	3925	38
Express	14	C	6300	3975	38
	15	C	6350	4025	38
	16	C	6400	4075	38
	17	C	6450	4125	38
Gorizont and Express	12	Ku	14325	11525	38
Express	20	Ku	14425	11625	38

2.0 THE GORIZONT SPACECRAFT

The Gorizont satellite is a telecommunications satellite intended for service in the geostationary orbit. It provides the full range of telecommunications services including video, voice, and data. The Gorizont spacecraft operates with six fixed service transponders in the C band, one fixed service transponder in K band, and an L-band transponder which is cross-strapped to one of the C-band transponders to provide double-hop mobile service.

The satellite is launched by a Proton launch vehicle into a nominal geostationary orbit. The orbit is immediately circularized, with an orbital period above or below that of a perfectly synchronous orbit so that the satellite will move to the desired geostationary location. A final orbit correction is made when the satellite reaches its service location to stabilize the orbit to a completely synchronous one. The same propulsion system then maintains the longitude of the spacecraft. No control of orbital inclination is provided. The Gorizont when first launched has an inclination of approximately -1.5°, which changes to positive inclination at the rate of about .85° per year. Inclination one and one half years after launch is therefore zero.

The spacecraft is 3-axis stabilized with the solar panels tracking the sun. Storage batteries are carried to provide operation during solar eclipse. Thermal control is provided in normal and eclipse operation. The propulsion system is a bipropellant type.

Spacecraft operation is autonomous. Telemetry, tracking and control information are recorded on-board the satellite and transmitted to the ground on command every ten to thirty days. However, changes from normal preset operating limits cause immediate alerting of ground control. Spacecraft housekeeping data, transponder and switching status, and orbital tracking information, are routinely collected. Command systems permit transponder and antenna switching, gain adjustments, and propulsion engine control for station keeping.

A number of telemetry, command and monitoring stations are used, thus providing redundant monitoring and control capability. These stations provide command and control of the spacecraft bus and configuration and control of the spacecraft payload. For the Gorizont, some reconfiguration of connections between transponders can be accomplished after launch, during the satellite's service life. For example, the high power transmitter can be connected to either the spot or global beam.

The principal spacecraft characteristics are shown in Table 2.1.

Table 2.1 GORIZONT Principal Characteristics

Characteristic	Value
In orbit mass	2200 kg
Overall Dimensions	5.45 x 3.3 x 9.46 m
Initial Propellant	68 kg bipropellant
Primary Power	1280 W EOL
Eclipse Operation	Full
Warranty Life	3 years
Service Life	3-5 years
Orientation	$\pm 0.2°$
Longitude	$\pm 0.2°$
Latitude	-1.5° at BOL, +1.5° at EOL

The principal characteristics, antenna connectivity of these transponders and frequencies are shown in Table 2.2. Figure 1 shows the communications system block diagram.

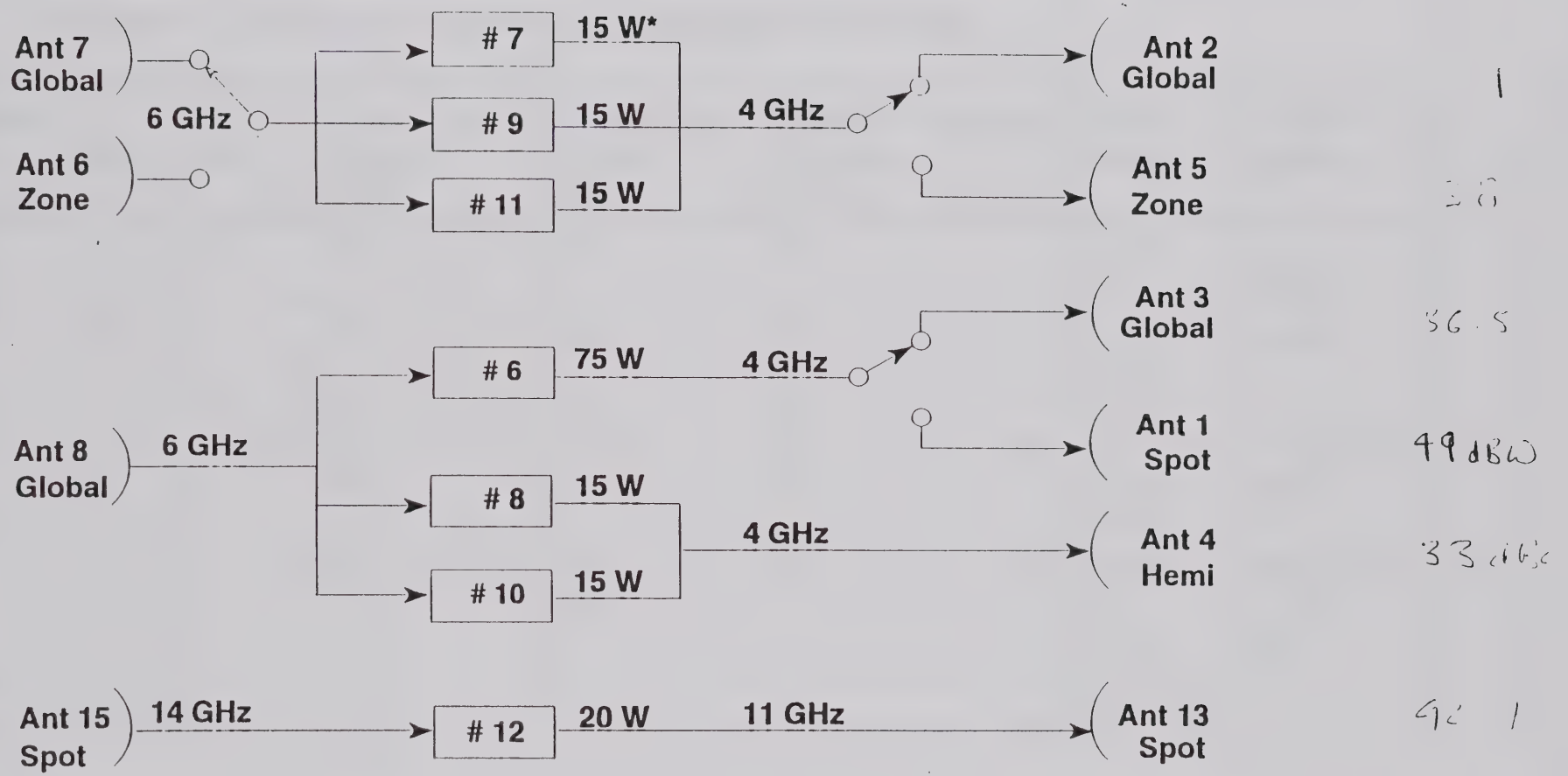


Figure 1

GORIZONT C AND KU BAND COMMUNICATIONS SUBSYSTEM

*Note: Transmitter Powers Are Nominal

Table 2.2 GORIZONT C and Ku Band Frequencies and Transponder Characteristics

Transponder Number	Band	Power (Watts)	Receive Center Frequency (MHz)	Transmit Center Frequency (MHz)	Nominal Transponder Bandwidth (MHz)	Receive Antennas	Transmit Antennas
6	C	75	6000	3675	40	global	spot, global
7	C	15	6050	3725	38	zone, global	global, zone
8	C	15	6100	3775	38	global	hemispheric
9	C	15	6150	3825	38	zone, global	global, zone
10	C	15	6200	3875	38	global	hemispheric
11	C	15	6250	3925	38	zone, global	global, zone
12	Ku	20	14325	11525	38	spot	spot

The polarization is:

	C band	Ku Band
Receive:	Right hand circular on all transponders	Vertical linear
Transmit:	Left hand circular on all transponders	Horizontal linear

The antenna characteristics are shown in Table 2.3 below; the specific individual satellite coverage areas from different orbital locations are shown in the Satellite Coverage Patterns.

Table 2.3 GORIZONT Antenna Beams

Spacecraft Antenna No.	Function	Beams
1	Transmit	Spot
2	Transmit	Global
3	Transmit	Global
4	Transmit	Hemispheric
5	Transmit	Zone
6	Receive	Zone
7	Receive	Global
8	Receive	Global
13	Transmit	Spot
15	Receive	Spot

The major RF characteristics of the transponders are shown in Tables 2.4 and 2.5, which show the e.i.r.p. and G/T respectively for each transponder. The normal transponder gain is 115 dB; it is adjustable from 105 to 125 dB. It is measured from the output of the receive antenna to the input of the transmit antenna, with the power amplifier at saturation.

Table 2.4 GORIZONT EIRP Summary

Trans-ponder	Transmit Center Frequency	Transmit Antenna	Transmit Beam	Transmitter Output Power (nominal W)	EIRP Maximum (dBW)	EIRP at EOC (-3 dB) (dBW)
6	3675	3	Global	75	36.7	33.7
		1	Spot		49.3	46.3
7	3725	2	Global	15	29.4	26.4
		5	Zone		37.8	34.8
8	3775	4	Hemi	15	32.7	29.7
9	3825	2	Global	15	29.6	26.6
		5	Zone		38.0	35.0
10	3875	4	Hemi	15	32.9	29.9
11	3925	2	Global	15	29.8	26.8
		5	Zone		38.2	35.2
12	11525	13	Spot	20	42.7	39.7

Table 2.5 Gorizont G/T Summary

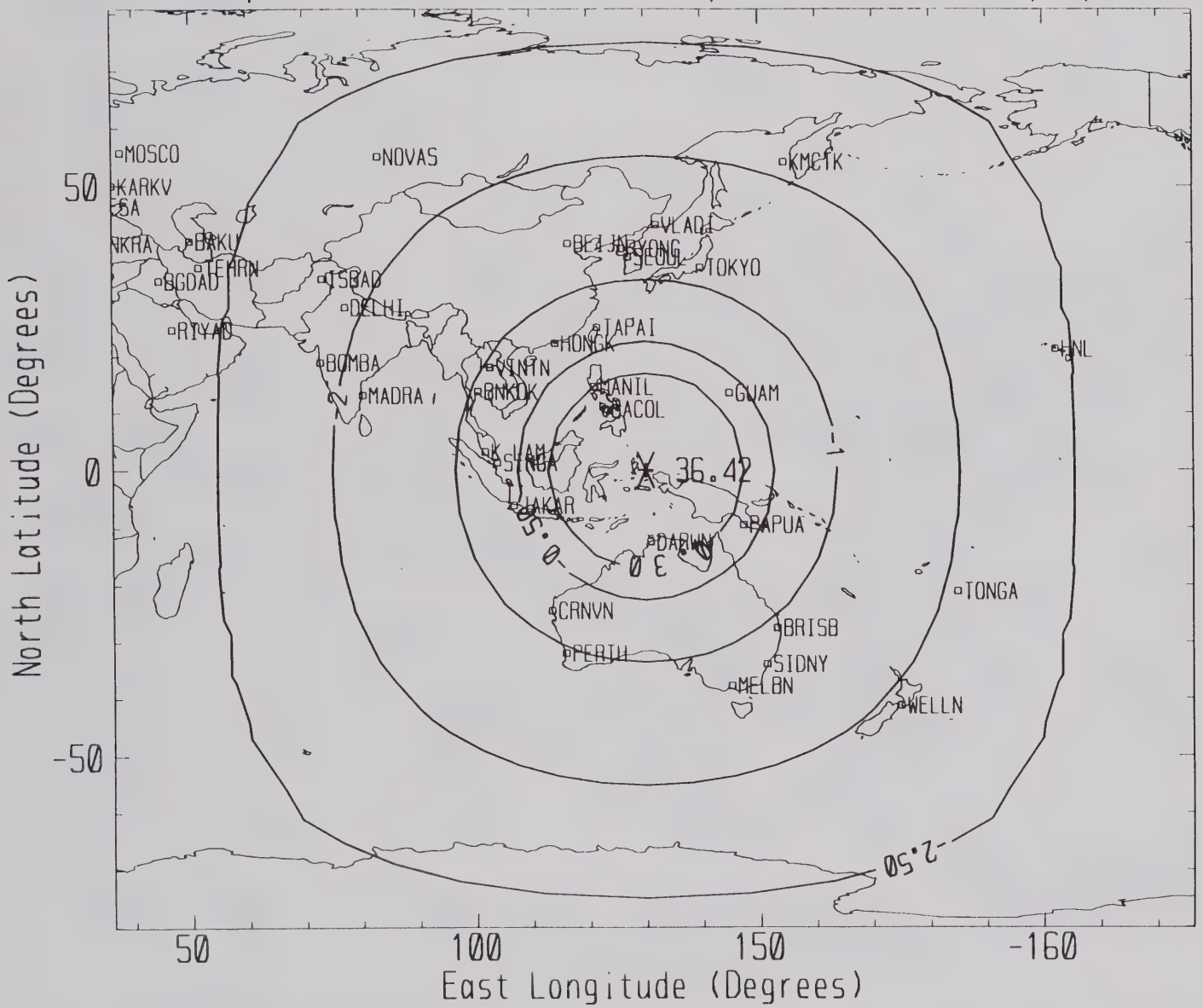
Trans-ponder	Receive Center Frequency	Receive Antenna	Receive Beam	G/T Maximum (dB/K)	G/T at -3 (dB/K)
6	6000	8	Global	-14.0	-17.0
7	6050	7	Global	-14.0	-17.0
		6	Zone	-5.2	-8.2
8	6100	8	Global	-14.0	-17.0
9	6150	7	Global	-14.0	-17.0
		6	Zone	-5.2	-8.2
10	6200	8	Global	-14.0	-17.0
11	6250	7	Global	-14.0	-17.0
		6	Zone	-5.2	- 8.2
12	14325	15	Spot	-5.8	-8.8

RIMSAT G-1 (130°E)

FOOTPRINTS

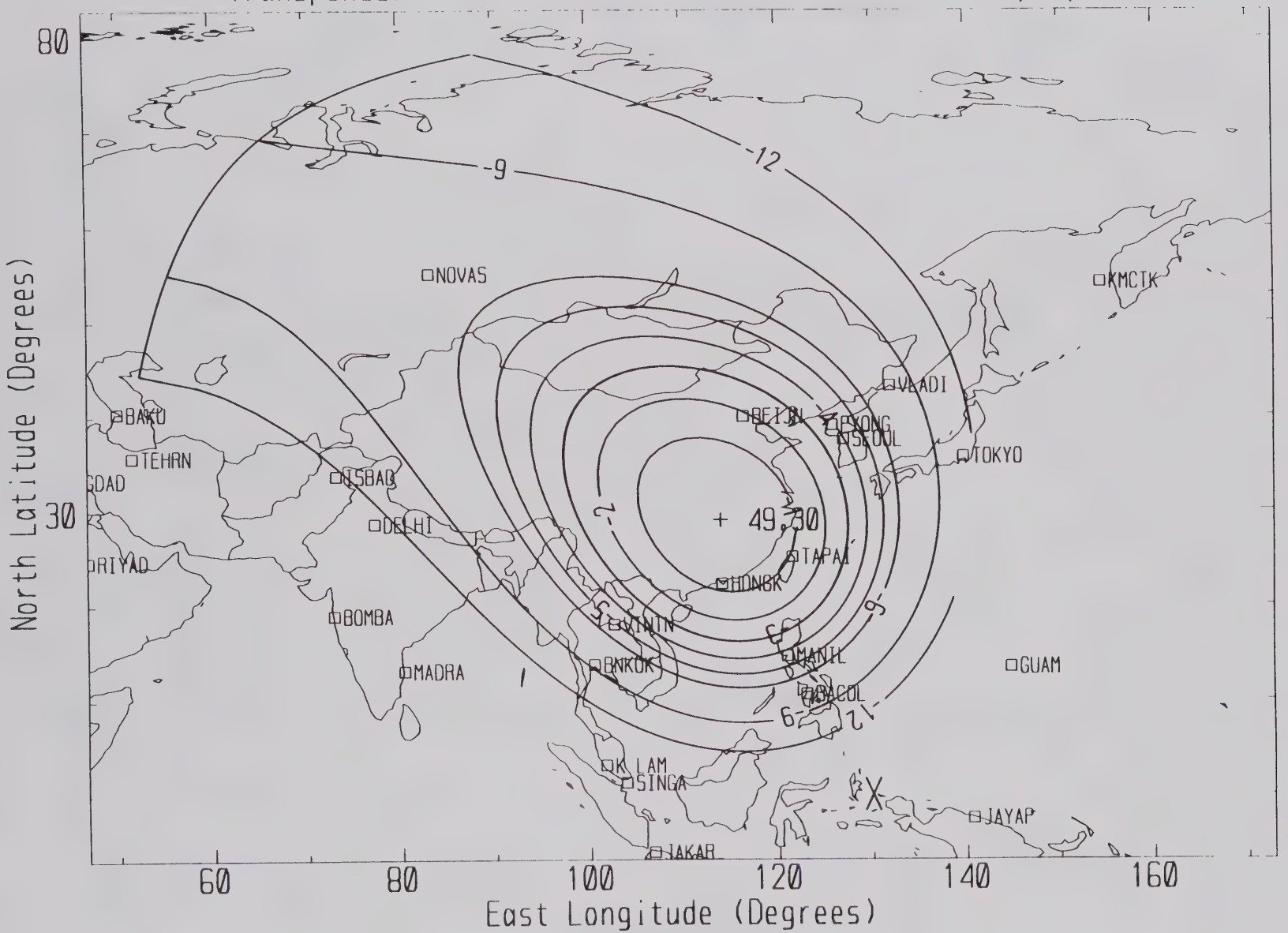
TR6

Rimsat 130 East Global Beam Coverage C Band 75 watts
Beam centered at Long. 130, Lat. 0. (RIMSAT G1)
Transponders # 6 Peak Eirp = 36.4 dBw 3/10/94



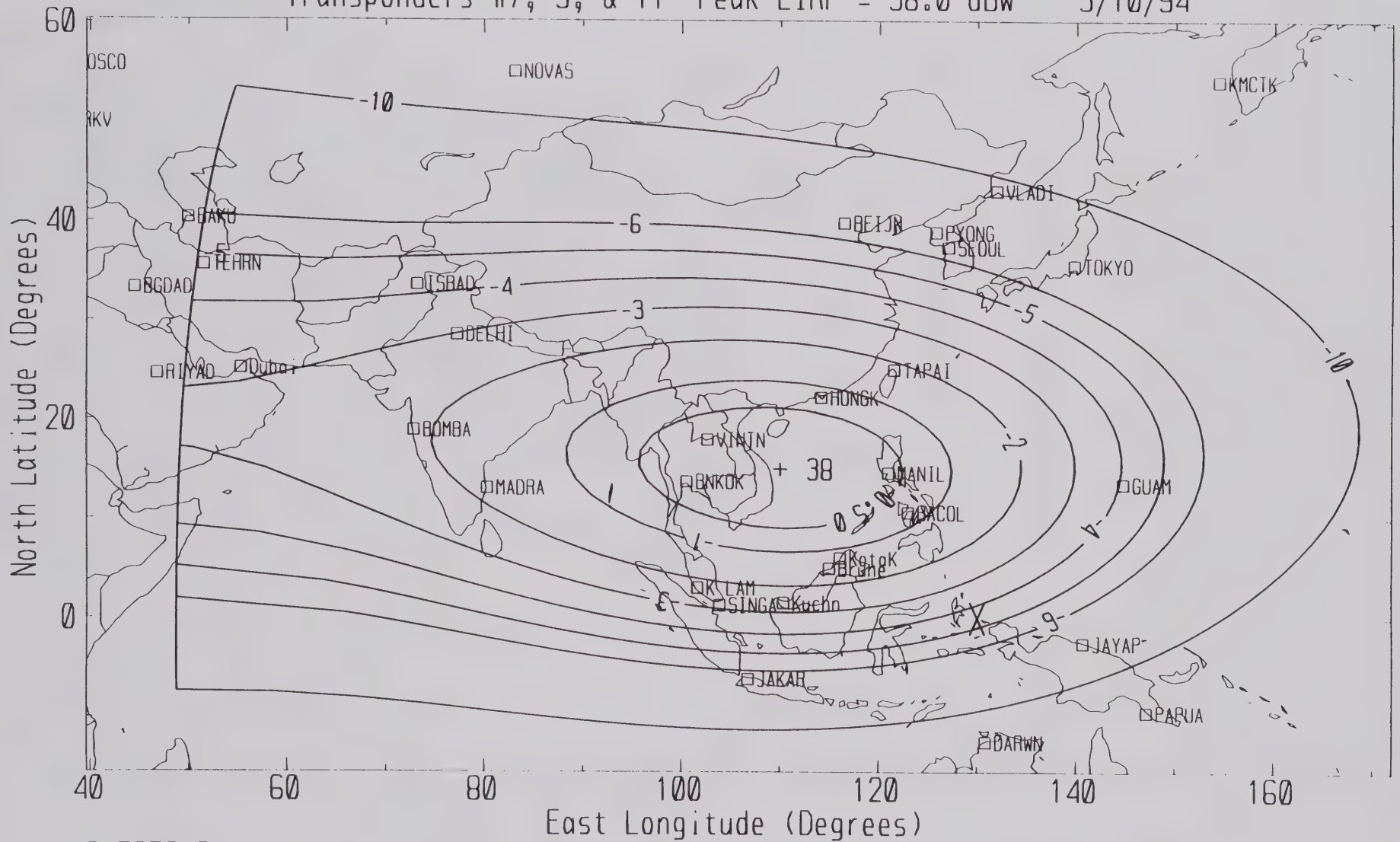
3.6750 GHz
Map: (130E,0S,35786)

Rimsat 130 East Spot Beam Coverage High Power Peak EIRP 49.3 dBw
Beam centered at Long. 114, Lat. 29. (RIMSAT G1)
Transponder # 6 Peak EIRP = 49.3 dw 3/10/94

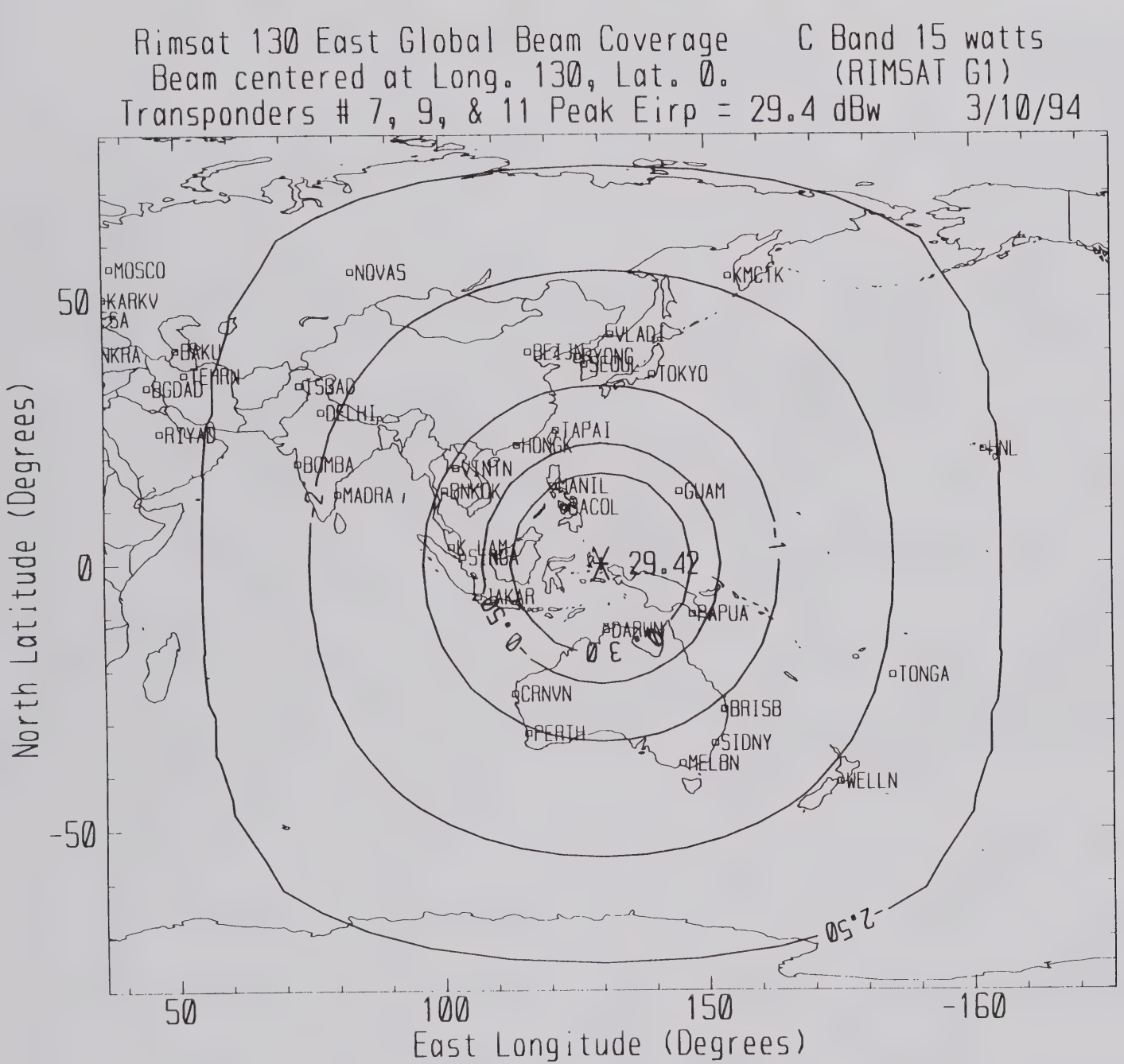


3.6750 GHz
Map: (130E,0S,35786)

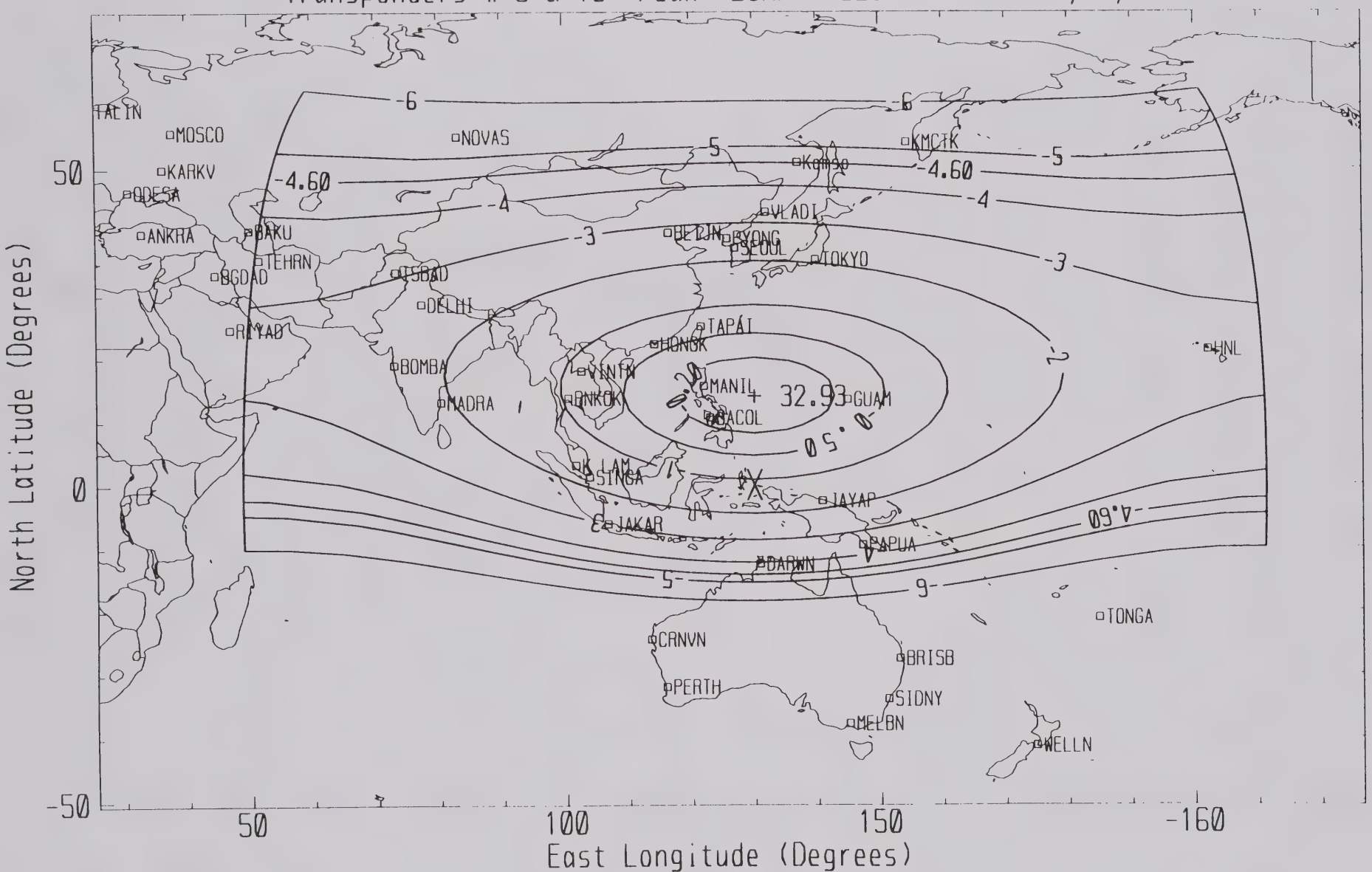
Rimsat 130 East Zone Beam Coverage C BAnd 15 watts
Beam centered at Long. 110, Lat. 15. (RIMSAT G1)
Transponders #7, 9, & 11 Peak EIRP = 38.0 dBw 3/10/94



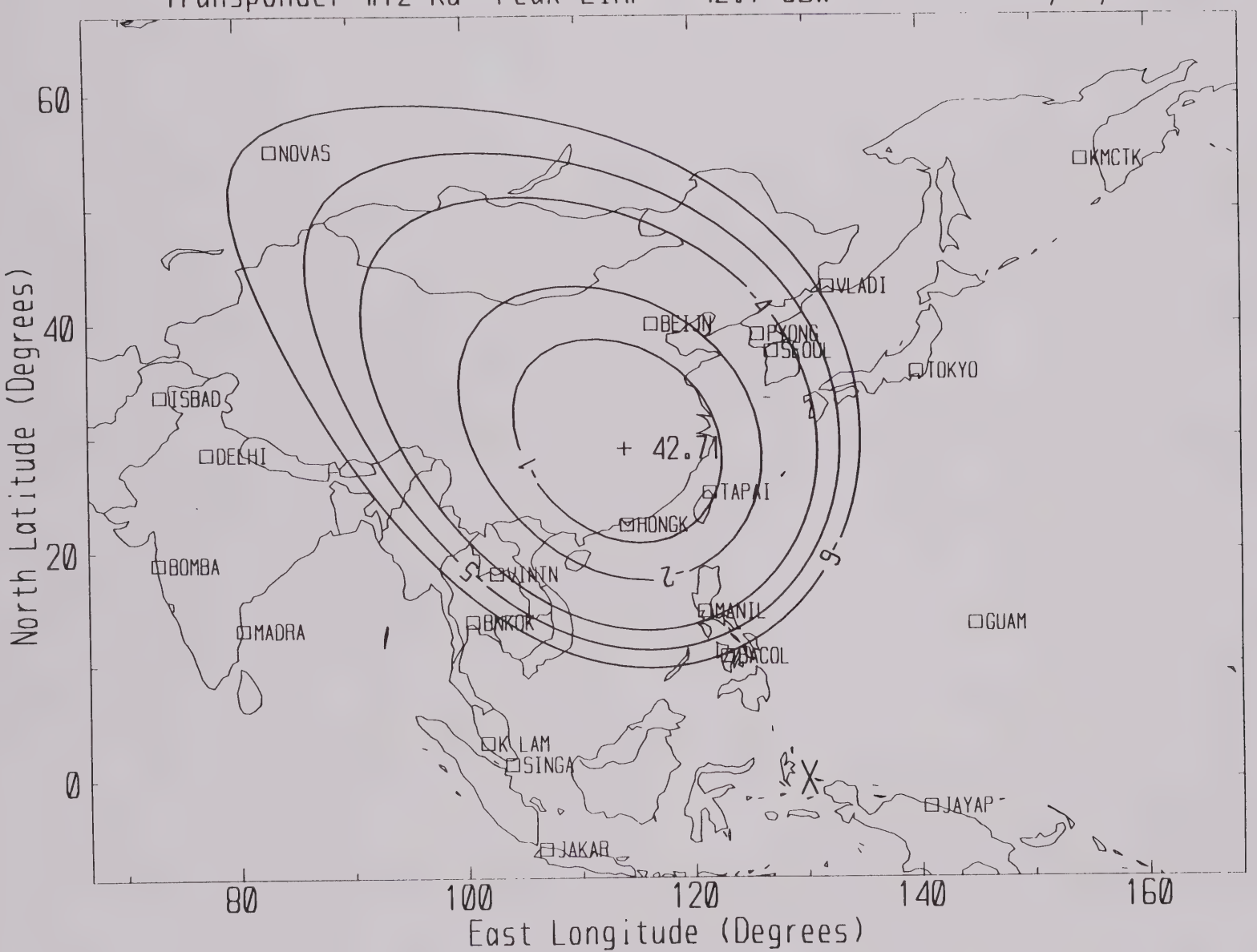
3.7250 GHz
Map: (130E,0S,35786)


Rimsat 130 East Global Beam Coverage
Beam centered at Long. 130, Lat. 0.
Transponders # 7, 9, & 11 Peak Eirp = 29.4 dBw
C Band 15 watts
(RIMSAT G1)
3/10/94
MOSCO
NOVAS
KARKV
BAKU
TEHRN
BGDAD
ISBAD
DELHI
RIYAD
BOMBA
MADRA
VLADV
BEIJING
SEOUL
TOKYO
KMCTK
HONGK
TAPAI
VNTN
BNKOK
MANIL
BACOL
GUAM
SINGA
JAKAR
DARWN
PAPUA
CRNVN
PERTH
BRISB
SIDNY
MELBN
WELLN
TONGA
INL
29.42
2.50
50
0
-50
50
100
150
-160
North Latitude (Degrees)
East Longitude (Degrees)
3.7750 GHz
Map: (130E,0S,35786)

Rimsat 130 East Hemi Beam Coverage C Band 15 watts
Beam centered at Long. 130, Lat. 14 (RIMSAT G1)
Transponders # 8 & 10 Peak EIRP = 32.9 dBw 3/10/94



3.7750 GHz
Map: (130E,0S,35786)

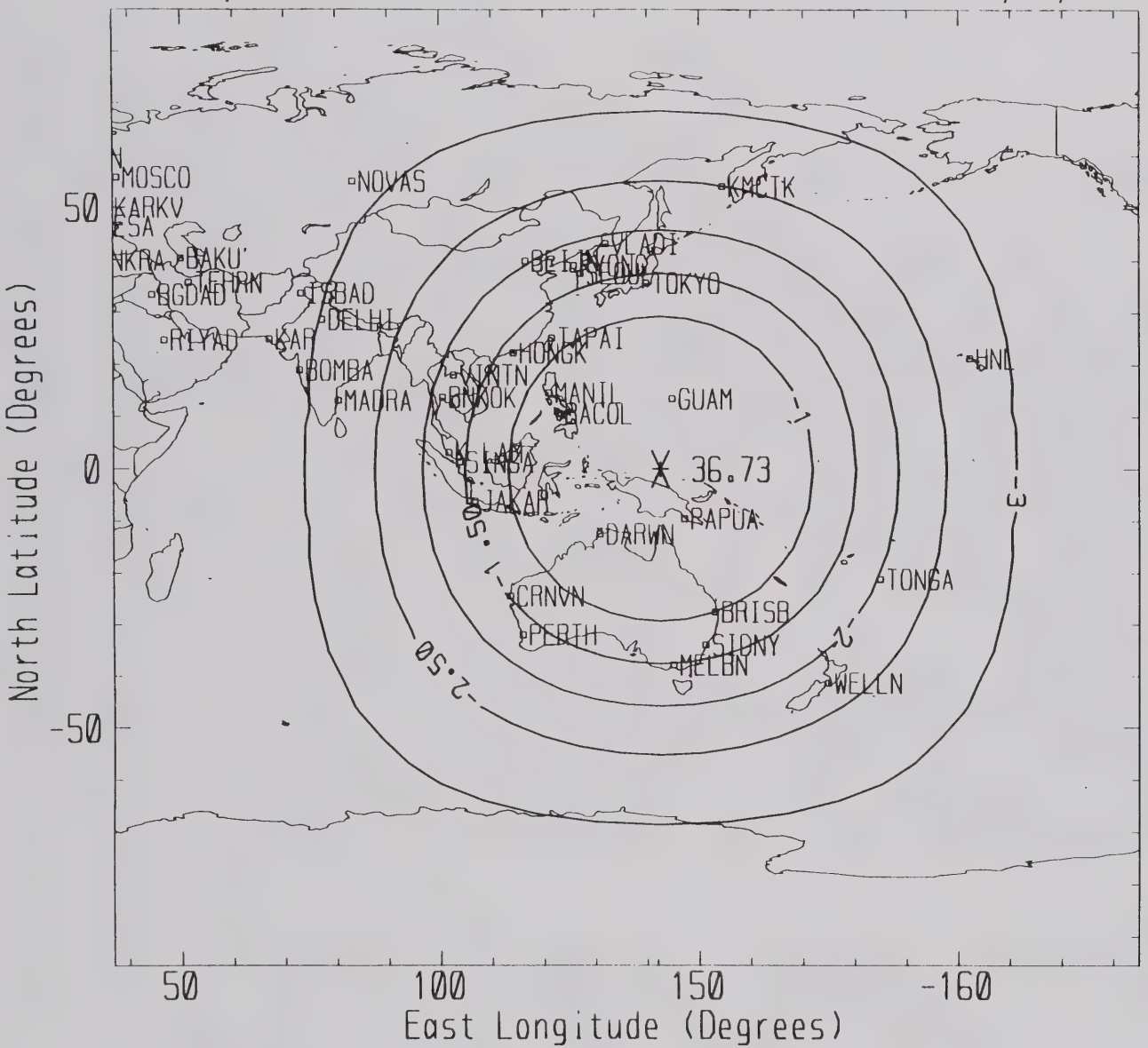

Rimsat 130 East Spot Beam Coverage Ku band 20 watts
Beam centered at Long. 114, Lat. 29. (RIMSAT G1)
Transponder #12 Ku Peak EIRP = 42.7 dBw 3/10/94
60
40
20
0
North Latitude (Degrees)
80
100
120
140
160
East Longitude (Degrees)
NOVAS
KMCTK
VLADI
BEIJN
PYONG
SEOUL
TOKYO
ISBAD
DELHI
+ 42.7
TAPAI
HONGK
BOMBA
QUINTN
MANIL
GUAM
MADRA
BNKOK
COL
K LAM
SINGA
JAYAP
JAKAR
11.5250 GHz
Map: (130E,0S,35786)

RIMSAT G-2 (142.5°E)

FOOTPRINTS

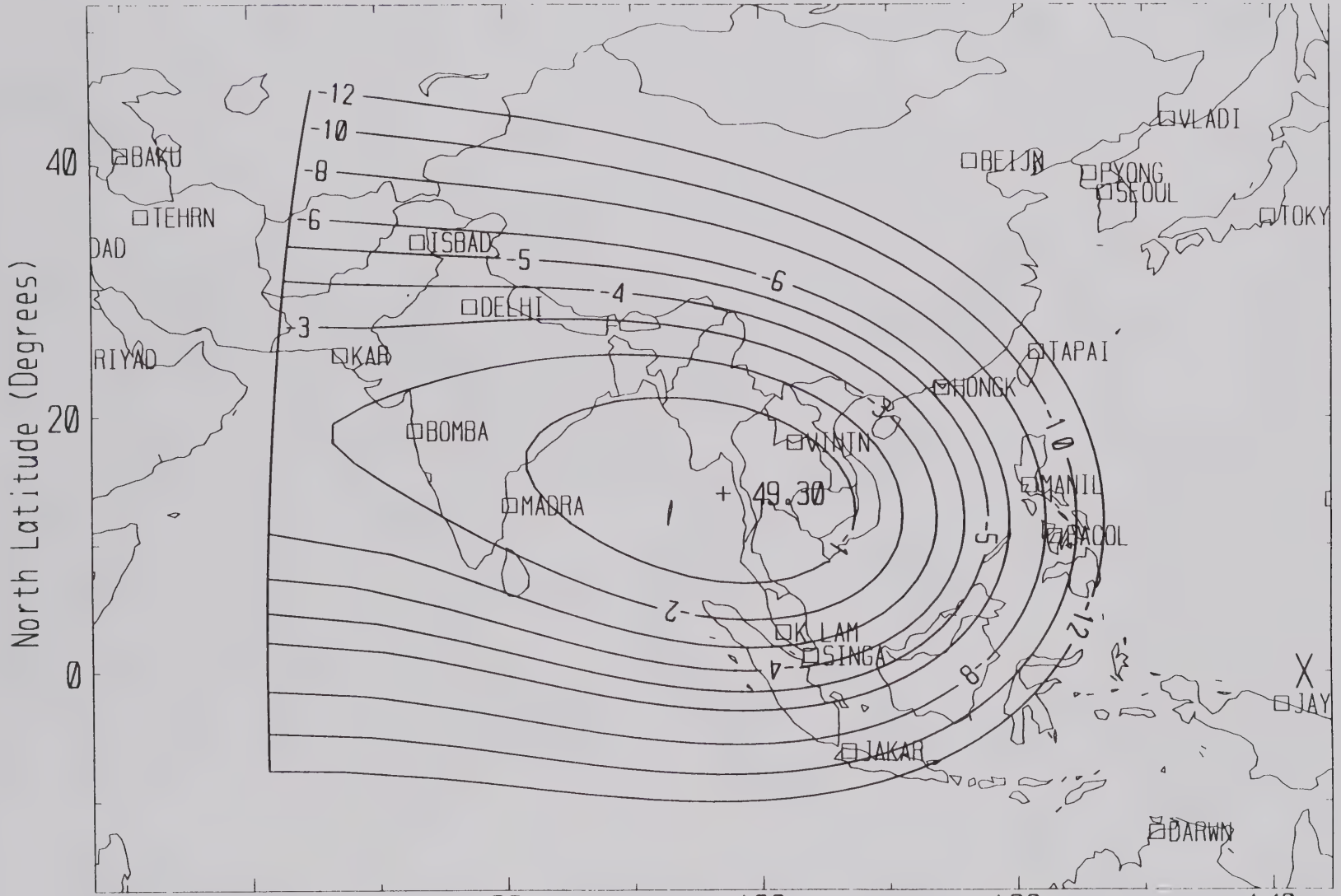
TR6

Rimsat 142.5 East High Power Global Beam Coverage C Band 75 watts
Beam centered at Long. 142.5, Lat. 0. (RIMSAT G2)
Transponders #6 Peak EIRP = 36.7 dBw 3/10/94



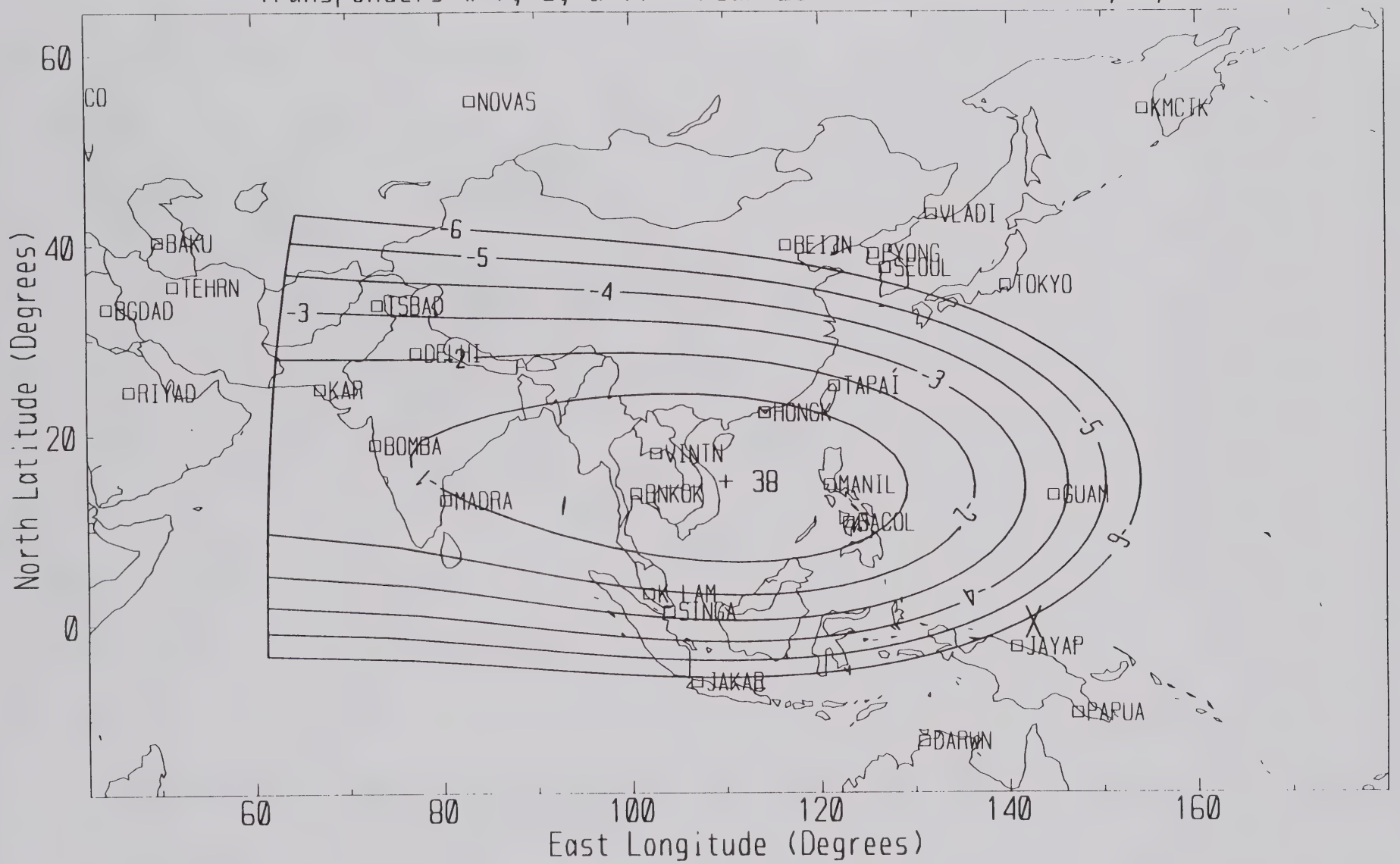
3.6250 GHz
Map: (142.50E,0S,35786)

Rimsat 142.5 East Spot Beam Coverage C band 75 watts
Beam centered at Long. 97 deg, Lat. 14 deg. (RIMSAT G2)
Transponder # 6 Peak EIRP + 49.3 dBw 3/10/94



3.6750 GHz
Map: (142.50E,0S,35786)

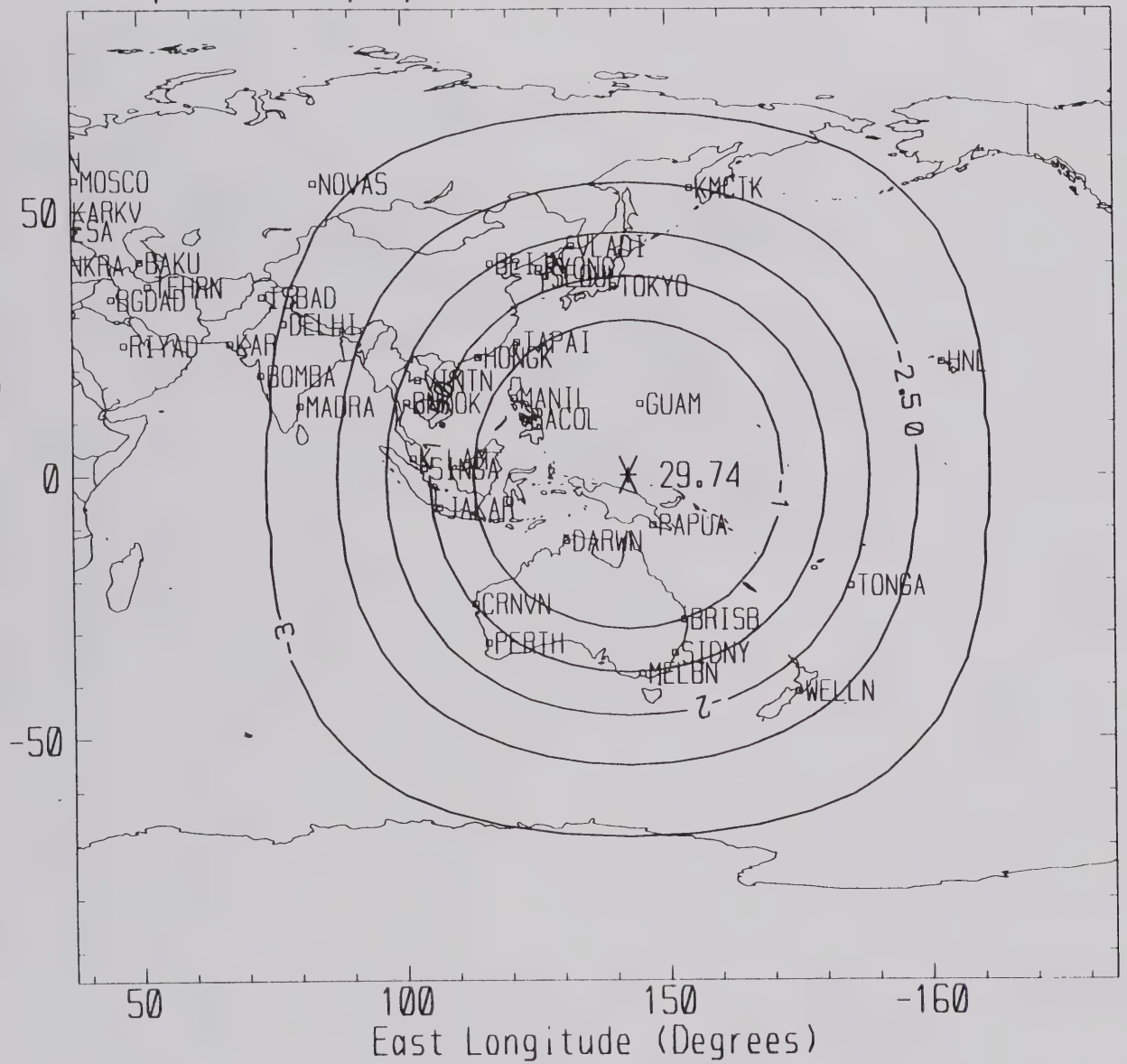
Rimsat 142.5 East, Zone Beam Coverage C Band 15 watts
Beam centered at Long. 110 deg, Lat. 15 deg. (RIMSAT G2)
Transponders # 7, 9, & 11 Peak EIRP 38.0 dBw 3/10/94



3.7250 GHz
Map: (142.50E,0S,35786)

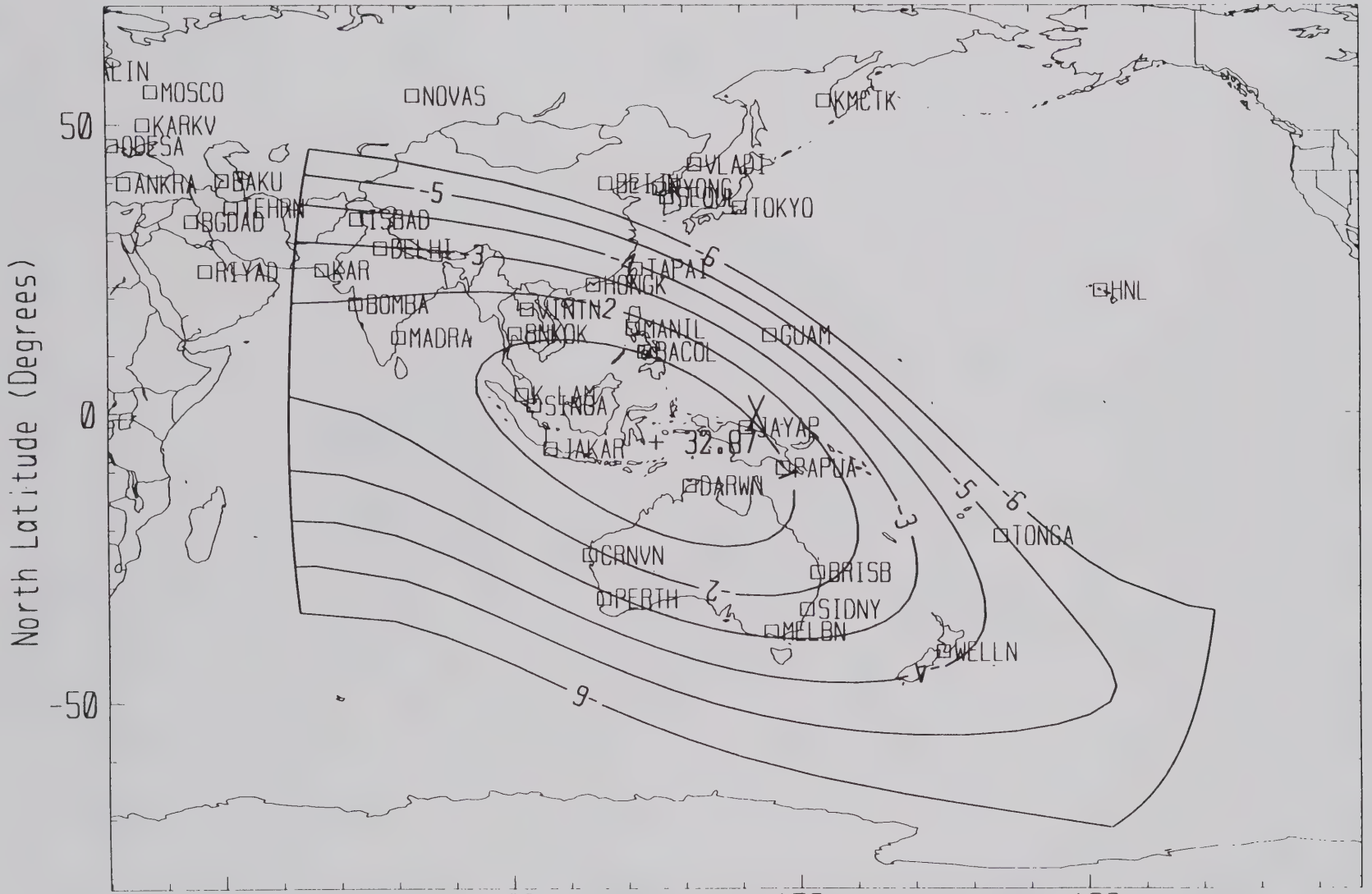
Rimsat 142.5 East Global Beam Coverage C Band 15 watts
Beam centered at Long. 142.5, Lat. 0. (RIMSAT G2)
Transponders #7, 9, 11 Peak EIRP = 29.7 dBw 3/10/94

7, 9, 11



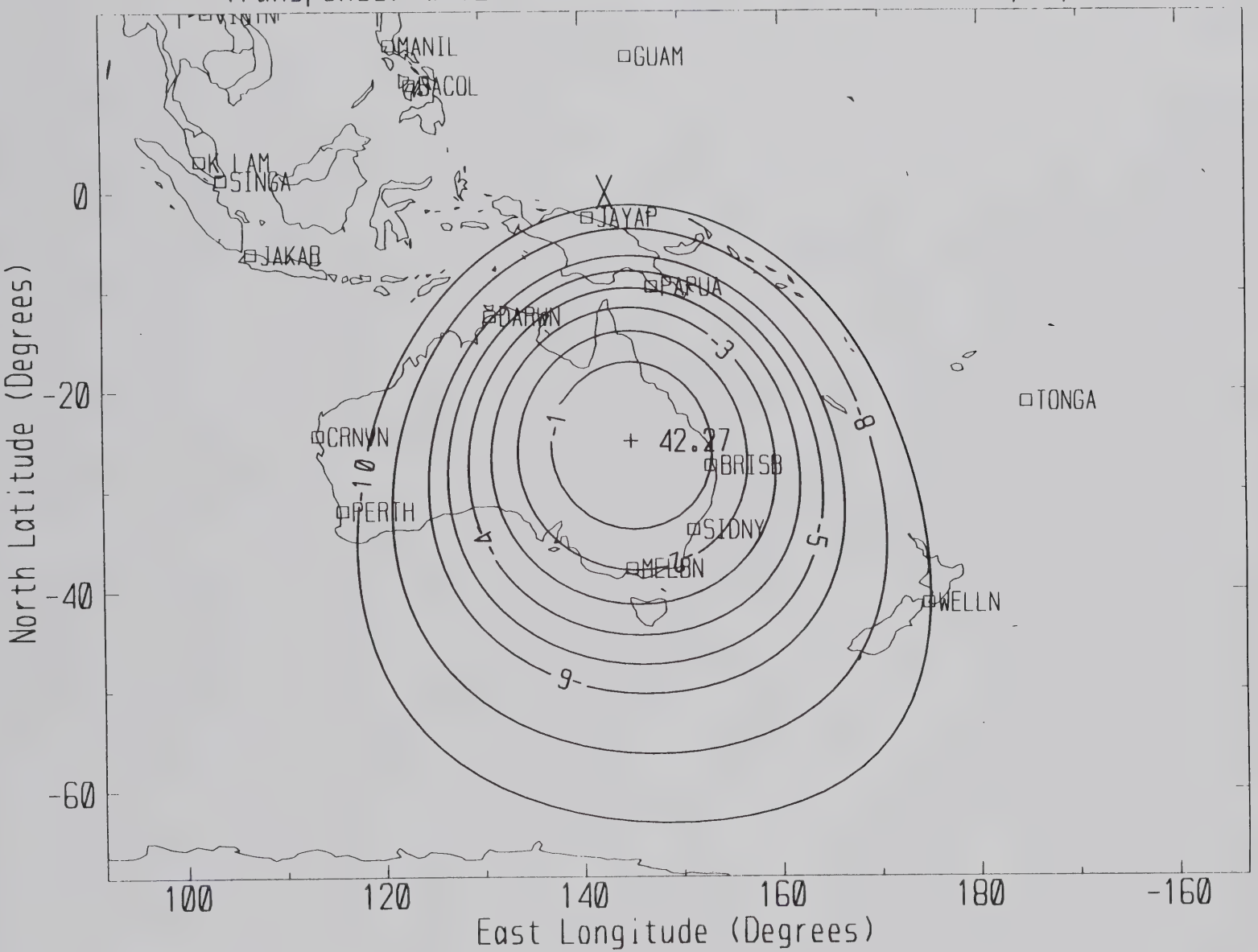
3.7250 GHz
Map: (142.50E,0S,35786)

Rimsat 142.5 East Hemi Beam Coverage C Band 15 watts
Beam centered at Long. 125, Lat. -5, Angle = -30. (RIMSAT G2)
Transponders # 8 & 10 Peak EIRP = 32.9 dBw 3/10/94



3.7750 GHz
Map: (142.50E,0S,35786)

Rimsat 142.5 East Spot Beam Coverage Ku Band 20 watts
Beam centered at Long. 145, Lat. -25. (RIMSAT G2)
Transponder # 12 Peak EIRP = 42.3 dBw 3/10/94



11.5250 GHz
Map: (142.50E,0S,35786)

RIMSAT SYSTEM DESCRIPTION

EXPRESS SATELLITE

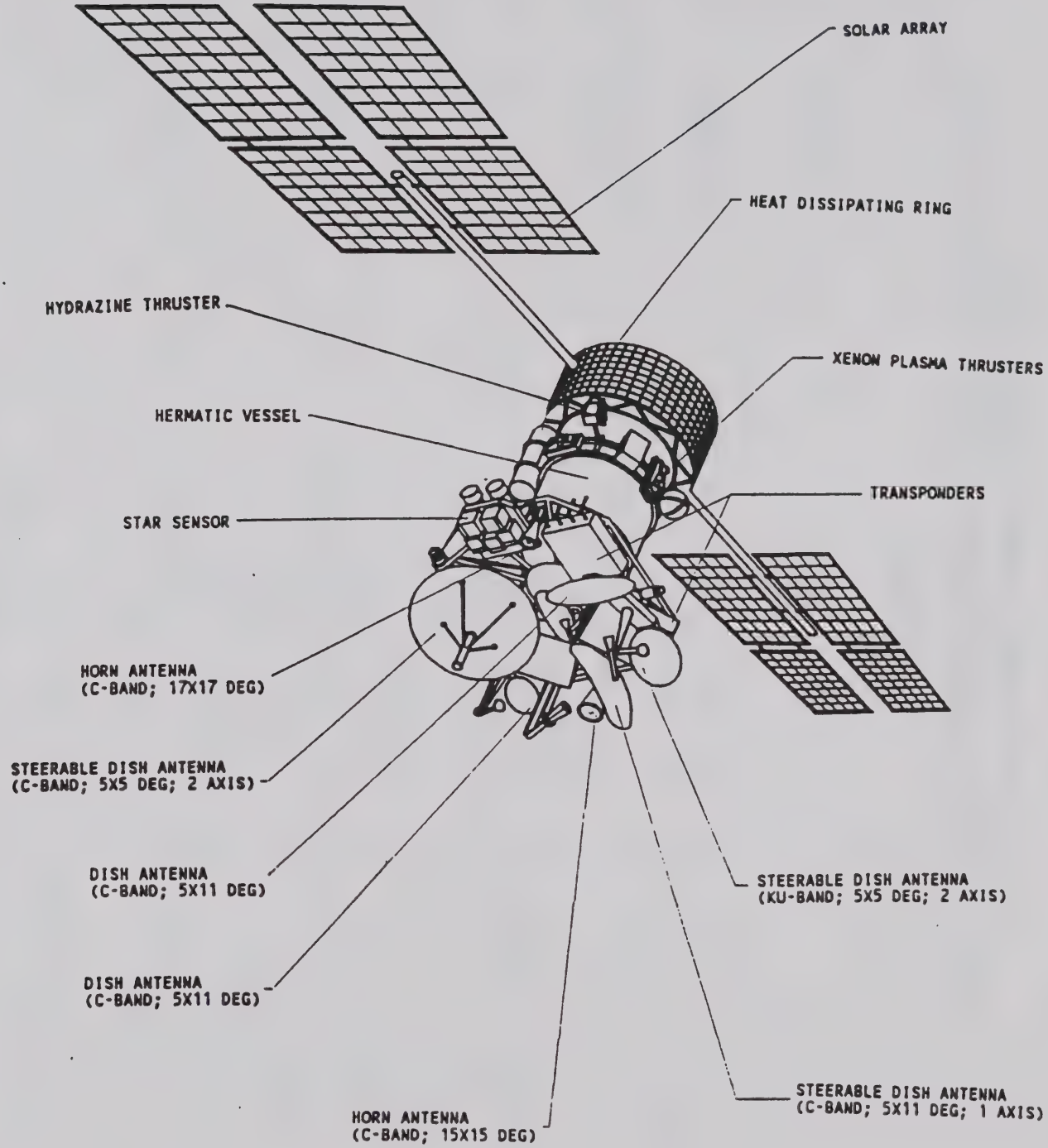


FIGURE 7

EXPRESS SATELLITE
ON-ORBIT CONFIGURATION

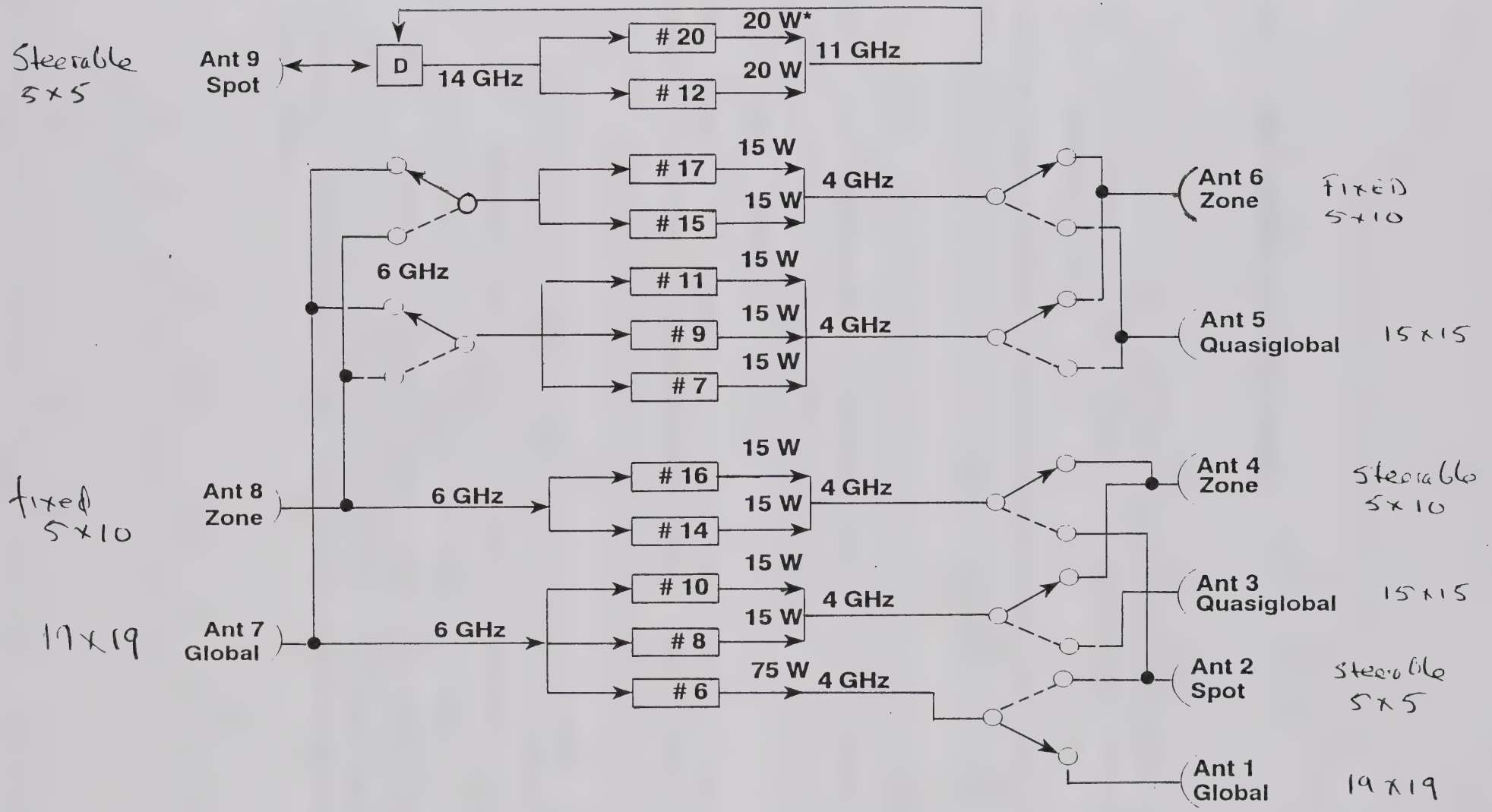


Figure 2

EXPRESS COMMUNICATIONS SUBSYSTEM

*Note: Transmitter Powers Are Nominal

3.0 THE EXPRESS SPACECRAFT

The Express spacecraft is a telecommunications satellite intended for service in the geostationary orbit. The Express payload has 12 fixed service transponders, 10 at C band and two at K band, and provides a full range of telecommunications services including video, telephone, and data.

As in the Gorizont, gain settings are adjustable over the same wide range, continuously over 20 dB, and North-South station keeping is provided. The Express has 12 transponders, and is station-kept both in North-South and East-West orientation.

The satellite is launched by a Proton launch vehicle into a nominal geostationary orbit. The orbit is circularized and a period selected above or below the perfectly synchronous orbit so that the satellite will move to the desired orbital location. On reaching its service location a final orbit correction is made to stabilize the satellite orbit to a completely synchronous one. The same propulsion system then maintains the latitude and longitude of the spacecraft throughout its service life.

The spacecraft is 3-axis stabilized with the solar panels tracking the sun. Storage batteries are provided for operation during solar eclipse. Thermal control is provided in normal and eclipse operation. The propulsion system uses hydrazine for spacecraft orientation and longitude control and xenon ion engines for inclination control.

Spacecraft operation is autonomous. Telemetry, tracking and control (TT&C) information is recorded on-board the satellite and transmitted to the ground on command every 10 to 30 days. However, changes out of normal preset operating limits cause immediate alerting of ground control. This TT&C information comprises spacecraft housekeeping data, transponder and switching status, and orbital tracking information. A number of telemetry, command and monitoring stations are used, thus providing redundant monitoring capability. These stations provide command and control of the spacecraft bus and configuration and control of the spacecraft payload. Command systems permit transponder and antenna switching, gain adjustments, and propulsion engine control for station keeping.

The principal spacecraft characteristics are shown in Table 3.1. Figure 2 provides a block diagram of the communications subsystem. EXPRESS comprises twelve transponders, two at Ku band and ten at C band. The principal characteristics and antenna connectivity of these transponders are shown in Table 3.2.

Table 3.1 EXPRESS Principal Characteristics

Characteristic	Value
In orbit mass	2500 kg
Overall Dimensions	6.10 x 3.6 x 21.0 m
Initial Propellant	25.5 kg hydrazine 56 kg xenon
Primary Power	2400 W EOL
Eclipse Operation	Full
Warranty Life	5 years (May be extended)
Service Life	5-7 years
Orientation	±0.1°
Longitude	±0.1°
Latitude	±0.1°

Table 3.2 **EXPRESS C and Ku Band Frequencies and Transponder Characteristics**

Transponder Number	Band	Power (Watts)	Receive Center Frequency (MHz)	Transmit Center Frequency (MHz)	Nominal Transponder Bandwidth (MHz)	Receive Antennas	Transmit Antennas
6	C	75	6000	3675	40	7 (global)	1 (global), 2 (spot)
7	C	15	6050	3725	38	7 (global), 8 (zone)	5 (quasiglobal) 6 (zone)
8	C	15	6100	3775	38	7 (global)	3 (quasiglobal 4 (zone)
9	C	15	6150	3825	38	7 (global), 8 (zone)	5 (quasiglobal) 6 (zone)
10	C	15	6200	3875	38	7 (global)	3 (quasiglobal) 4 (zone)
11	C	15	6250	3925	38	7 (global), 8 (zone)	5 (quasiglobal) 6 (zone)
14	C	15	6300	3975	38	8 (zone)	2 (spot) 4 (zone)
15	C	15	6350	4025	38	7(global), 8 (zone)	5 (quasiglobal) 6 (zone)
16	C	15	6400	4075	38	8 (zone)	2 (spot) 4 (zone)
17	C	15	6450	4125	38	7 (global), 8 (zone)	5 (quasiglobal) 6 (zone)
12	Ku	20	14325	11525	38	9 (spot)	9 (spot)
20	Ku	20	14425	11625	38	9 (spot)	9 (spot)

Table 3.3 lists the antennas and their beam widths. The specific individual satellite coverage areas from different orbital locations are shown in the Satellite Coverage Patterns.

Table 3.3 EXPRESS Antenna Beamwidths

Antenna No.	Function	Beam widths
1	Transmit	Global 19°x19°
2	Transmit	Spot 5°x 5° steerable N-S ±1° E-W ±1°
3	Transmit	Quasiglobal 15°x 15°
4	Transmit	Zone 5°x10° steerable N-S ±7. E-W ±4
5	Transmit	Quasiglobal 15° x15°
6	Transmit	Zone 5° x10° FIXED
7	Receive	Global 19°x 19°
8	Receive	Zone 5°x 10° FIXED
9	Receive/Transmit Ku	Spot 5°x5° Steerable N-S ±7 E-W ±7

Polarization

Receive	C band:	Left hand circular (LHCP)
	Ku band:	Vertical linear
Transmit	C band:	Right hand circular (RHCP)
	Ku band:	Horizontal linear

Table 3.4 EXPRESS EIRP Summary

Transponder	Transmit Frequency	Transmit Beam	Transmitter Nominal Output Power (dBW)	EIRP Maximum (dBW)	EIRP at EOC(-3 dB) (dBW)
6	3675	Global	75	36.7	33.7
		Spot		49.3	46.3
7	3725	Quasiglobal	15	31.6	28.6
		Zone		38.5	35.5
8	3775	Quasiglobal	15	31.7	28.7
		Zone		38.6	35.6
9	3825	Quasiglobal	15	31.8	28.8
		Zone		38.7	35.7
10	3875	Quasiglobal	15	31.9	28.9
		Zone		38.8	35.8
11	3925	Quasiglobal	15	32.0	29.0
		Zone		38.9	35.9
14	3975	~~Quasiglobal~~ Spot	15	~~32.1~~ 42.3	~~29.1~~ 39.3
		Zone		39.0	36.0
15	4025	Quasiglobal	15	32.2	29.2
		Zone		39.1	36.1
16	4075	~~Quasiglobal~~ Spot	15	~~32.3~~ 42.4	~~29.3~~ 39.4
		Zone		39.2	36.2
17	4125	Quasiglobal	15	32.4	29.4
		Zone		39.3	36.3
12	11525	Spot	20	42.9	39.9
20	11625	Spot	20	42.9	39.9

The normal transponder amplification is 115 dB. It can be adjusted over a range of ± 10 dB continuously.

Table 3.5 **Express G/T Summary**

Transponder	Receive Center Frequency	Receive Beam	G/T Maximum (dB/K)	G/T at EOC (-3 dB) (dB/K)
6	6000	Global	-11.8	-14.8
7	6050	Global	-11.8	-14.8
		Zone	-2.8	-5.8
8	6100	Global	-11.8	-14.8
9	6150	Global	-11.8	-14.8
		Zone	-2.8	-5.8
10	6200	Global	-11.8	-14.8
11	6250	Global	-11.8	-14.8
		Zone	-2.8	-5.8
14	6300	Zone	-2.8	-5.8
15	6350	Global	-11.8	-14.8
		Zone	-2.8	-5.8
16	6400	Zone	-2.8	-5.8
17	6450	Global	-11.8	-14.8
		Zone	-2.8	-5.8
12	14325	Spot	-0.9	-3.9
20	14425	Spot	-0.9	-3.9

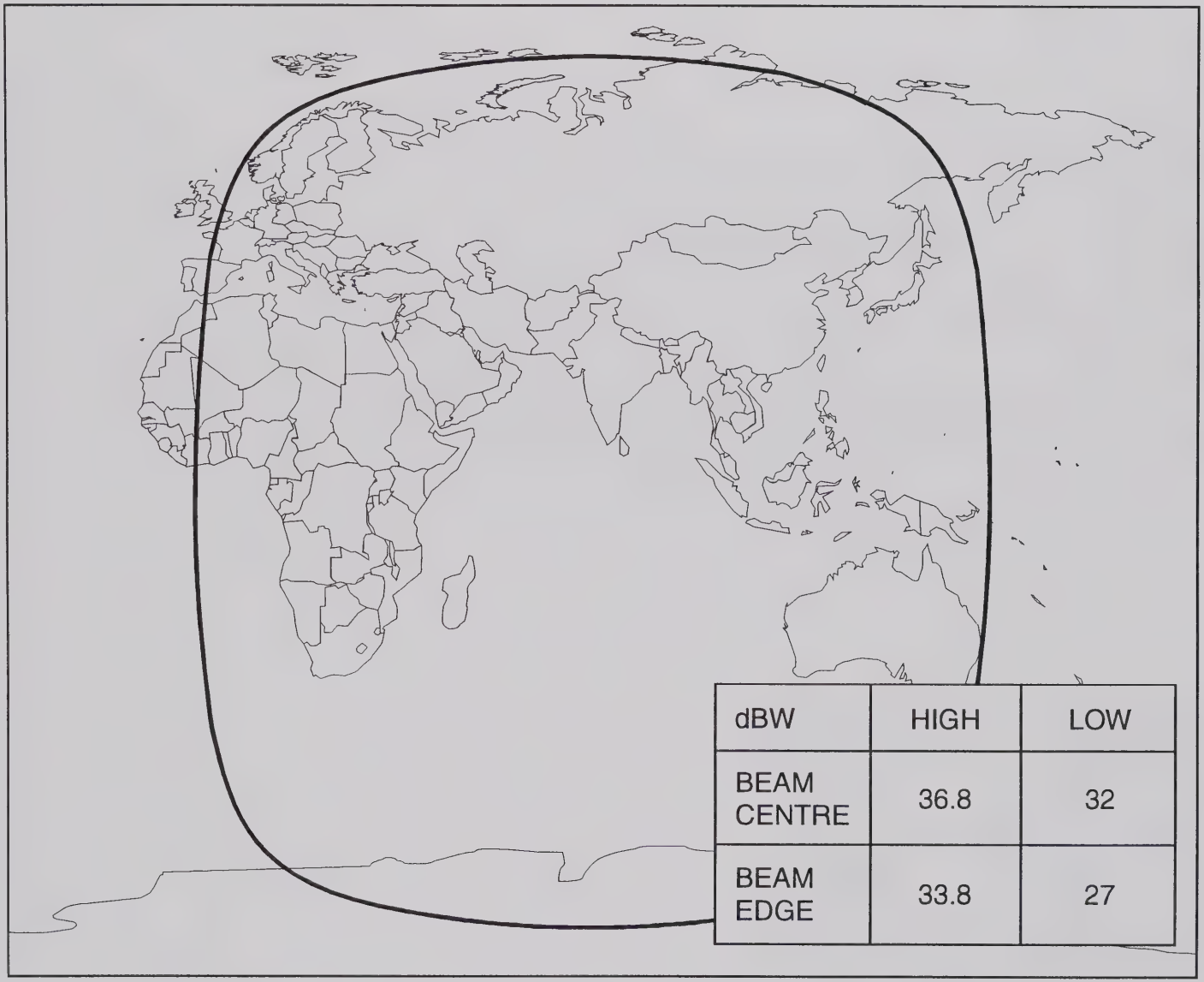
RIMSAT

EURASIA EXPRESS

(70° - 80°E)

(Scheduled March 1995)

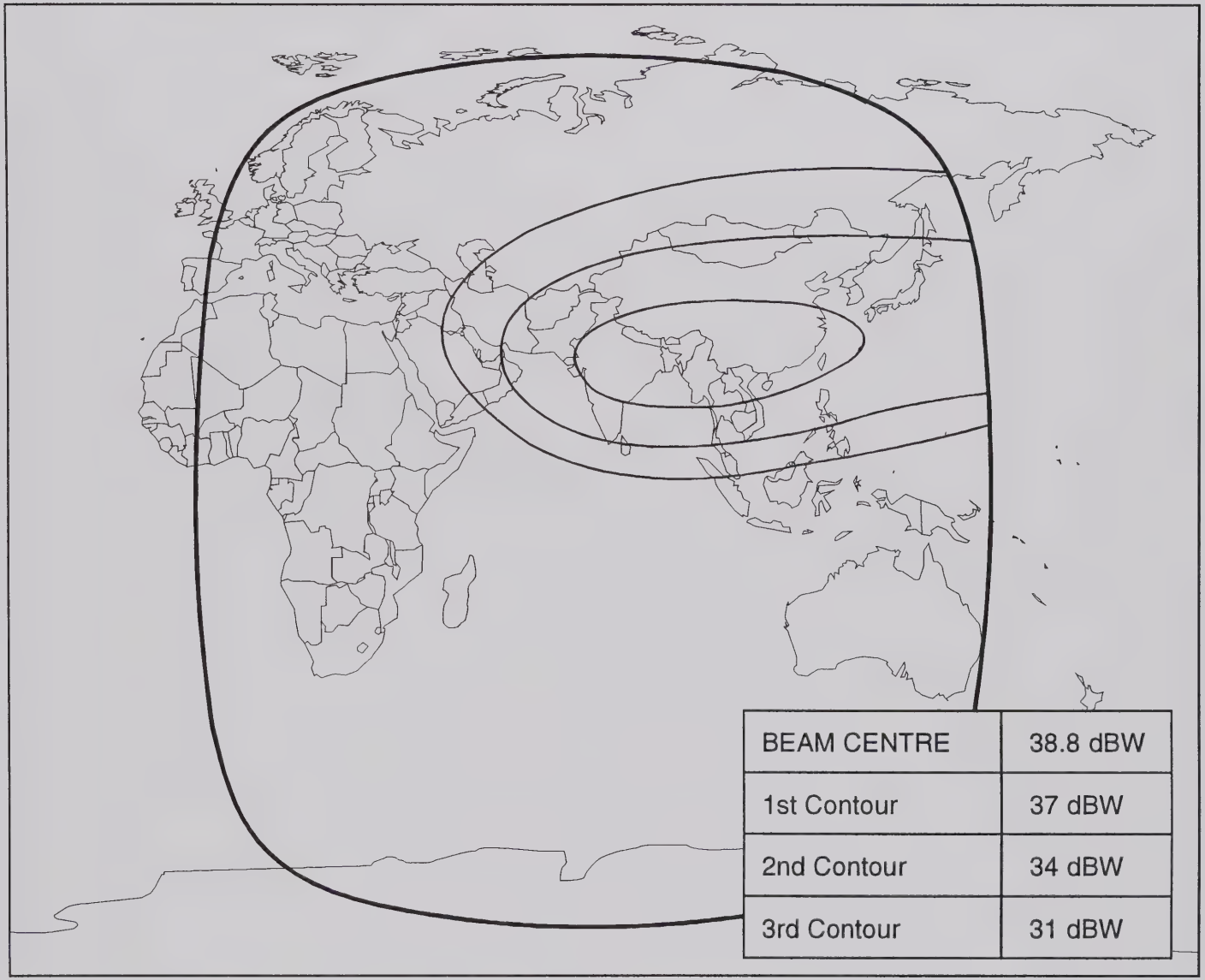
EURASIA EXPRESS (70°-80°E)



dBW	HIGH	LOW
BEAM CENTRE	36.8	32
BEAM EDGE	33.8	27

GLOBAL BEAM

EURASIA EXPRESS (70°-80°E)

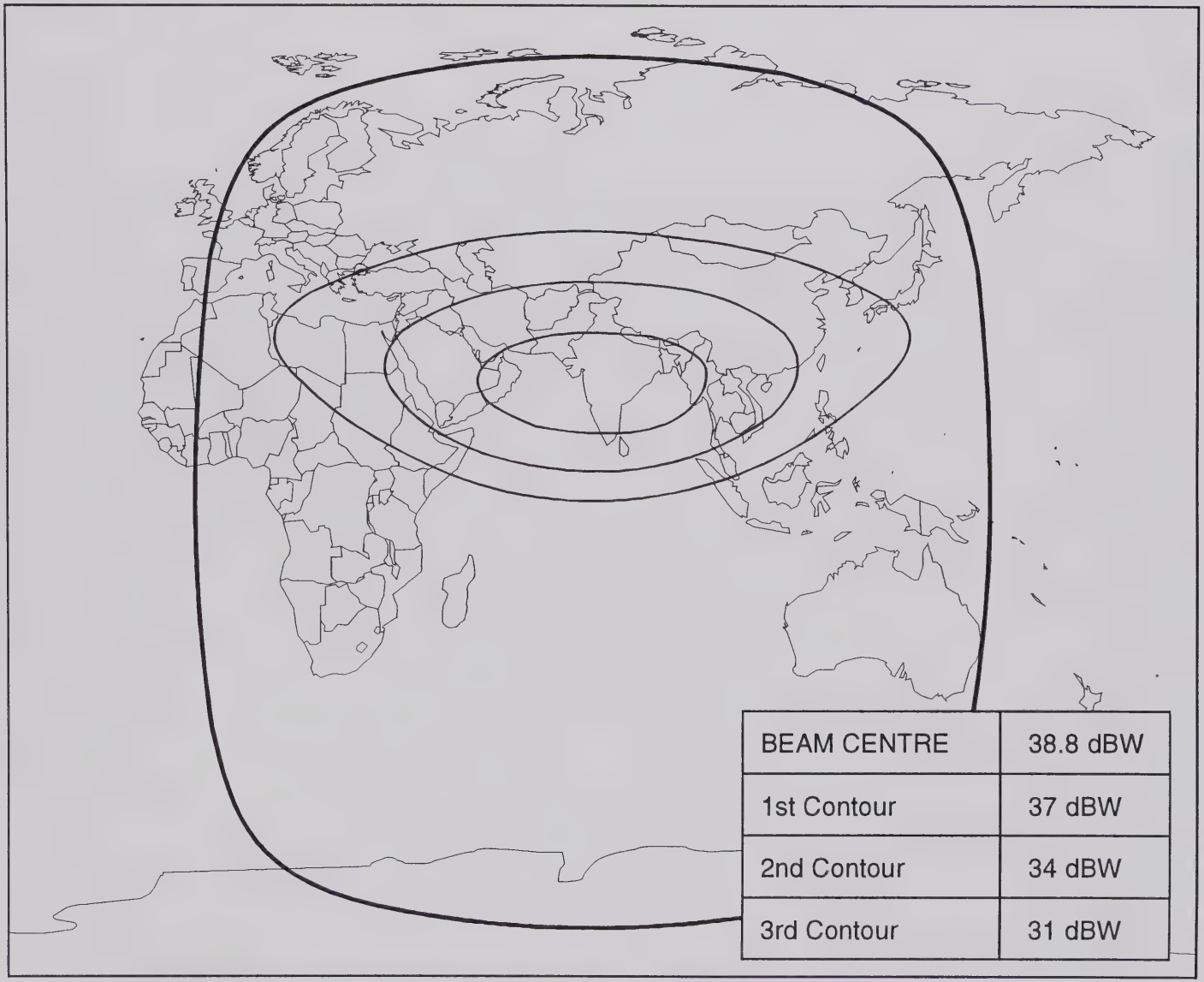


BEAM CENTRE	38.8 dBW
1st Contour	37 dBW
2nd Contour	34 dBW
3rd Contour	31 dBW

ZONE BEAM

RIMSAT

EURASIA EXPRESS (70°-80°E)

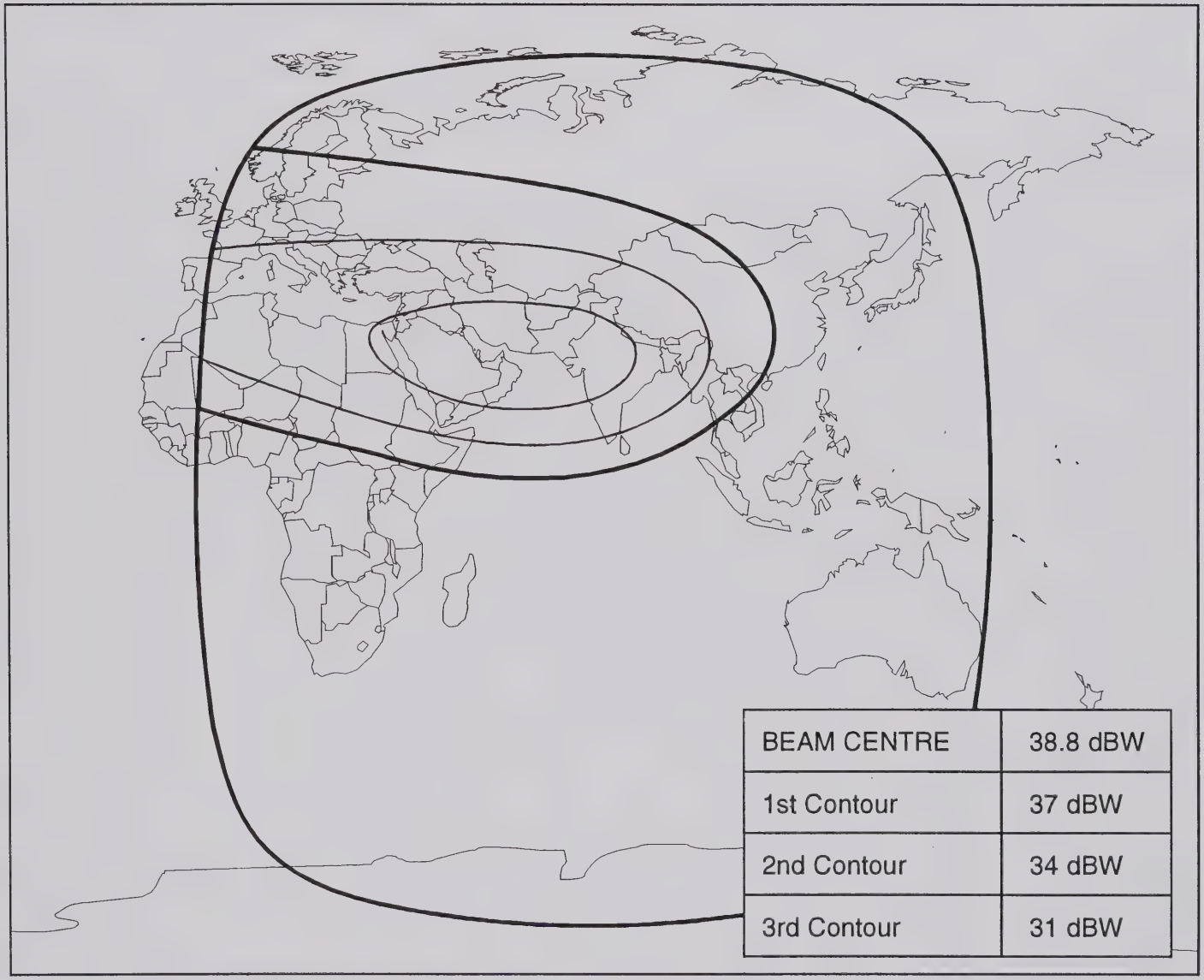


BEAM CENTRE	38.8 dBW
1st Contour	37 dBW
2nd Contour	34 dBW
3rd Contour	31 dBW

ZONE BEAM

RIMSAT

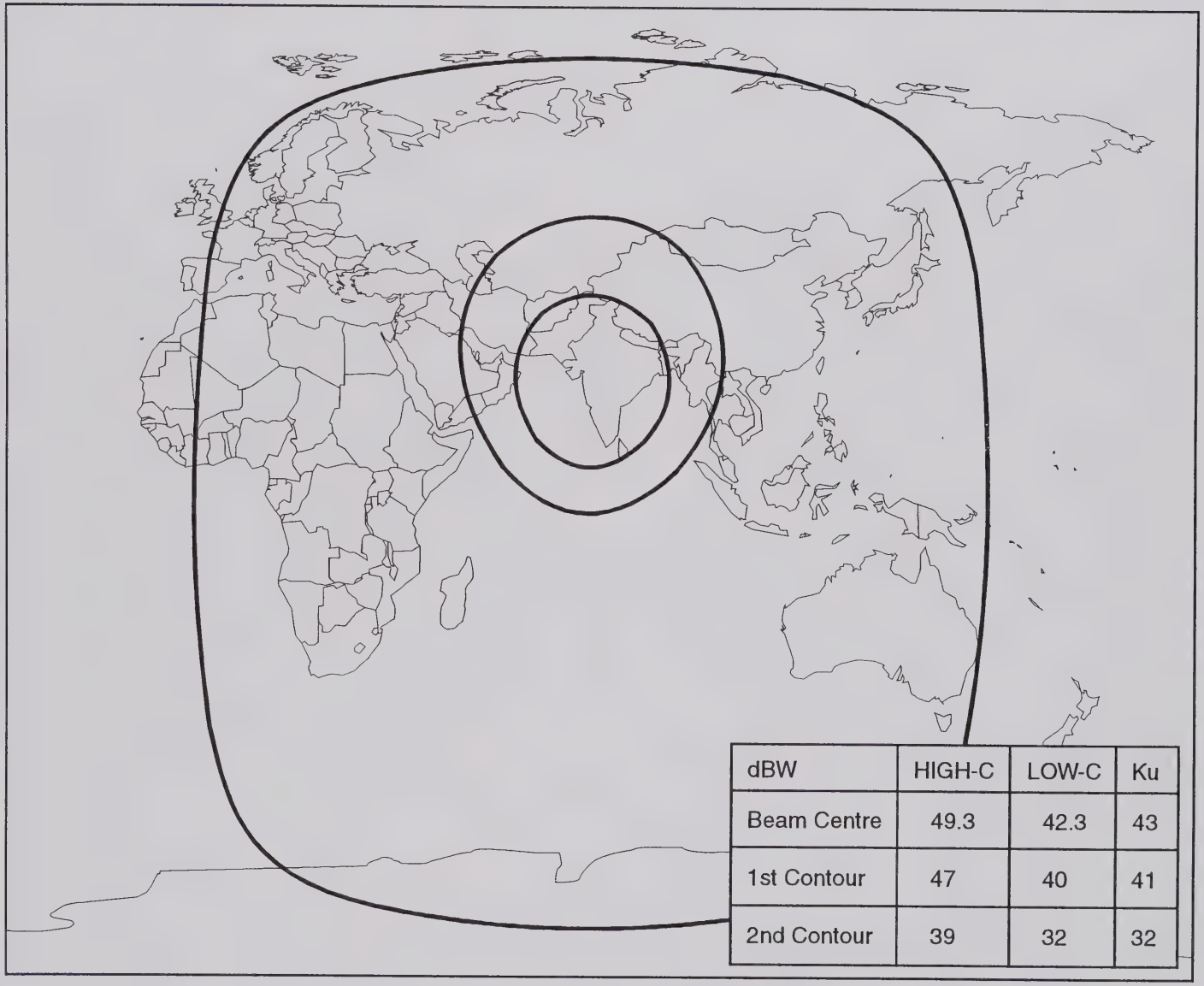
EURASIA EXPRESS (70°-80°E)



BEAM CENTRE	38.8 dBW
1st Contour	37 dBW
2nd Contour	34 dBW
3rd Contour	31 dBW

ZONE BEAM

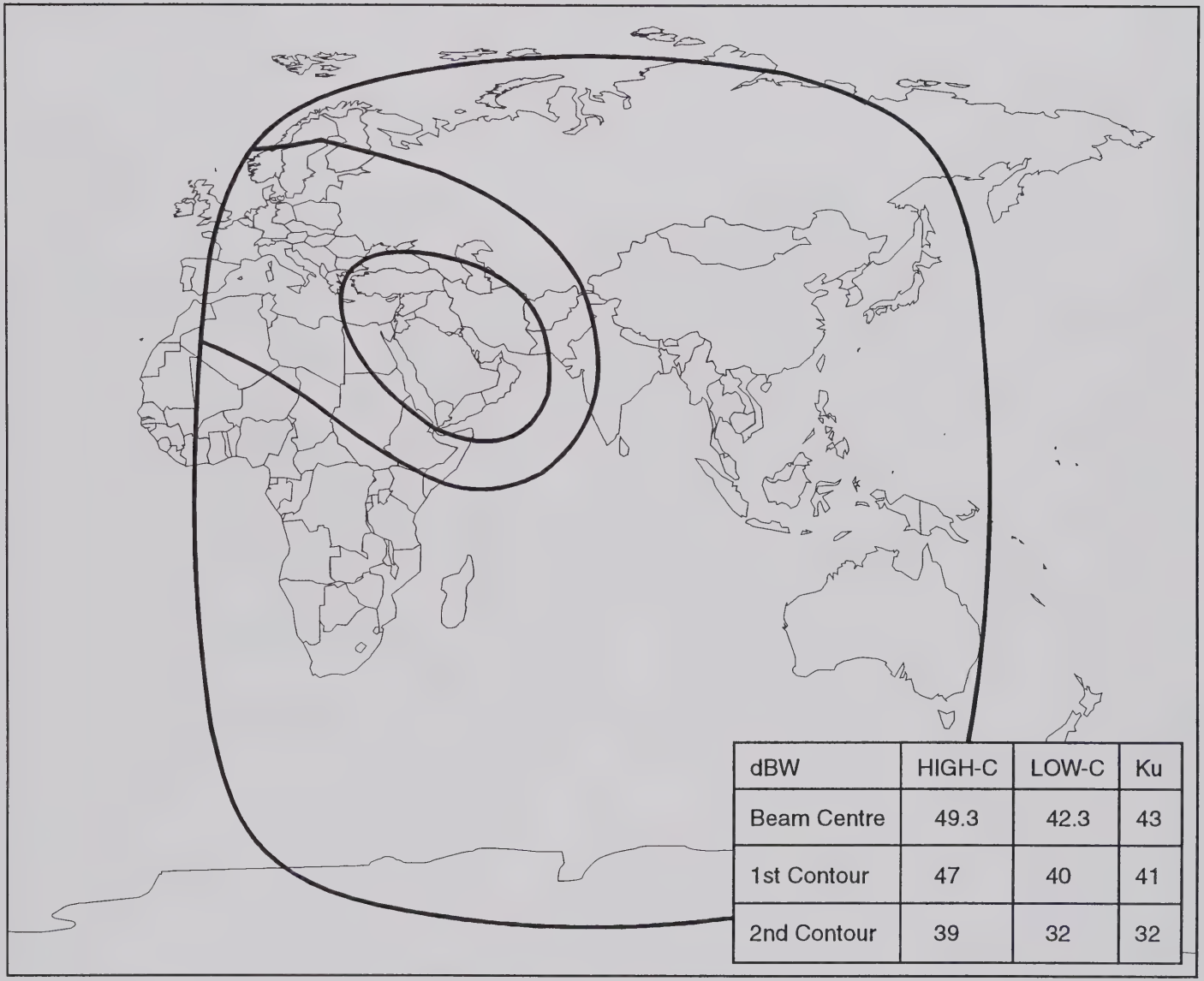
EURASIA EXPRESS (70°-80°E)



dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
2nd Contour	39	32	32

SPOT BEAMS

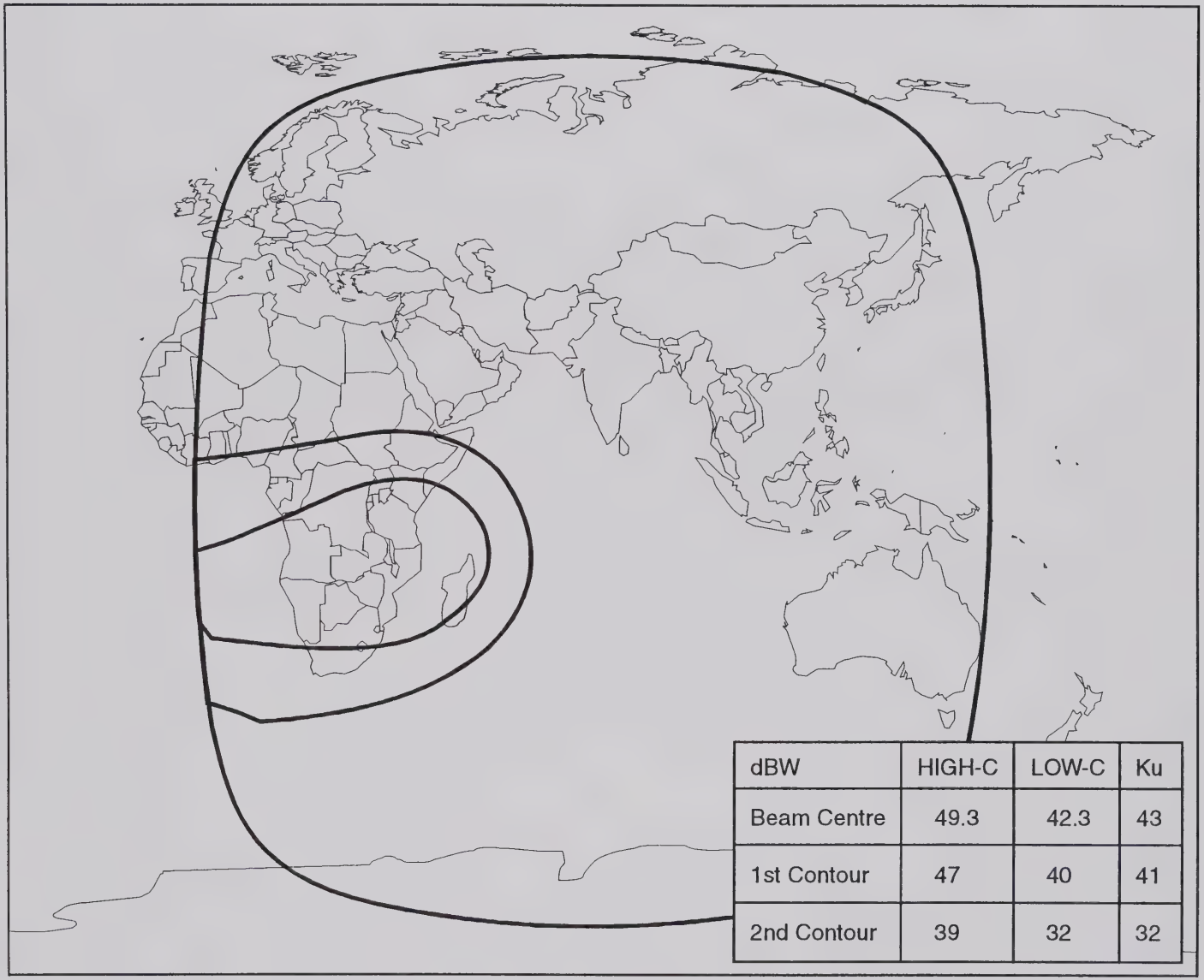
EURASIA EXPRESS (70°-80°E)



dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
2nd Contour	39	32	32

SPOT BEAMS

EURASIA EXPRESS (70°-80°E)

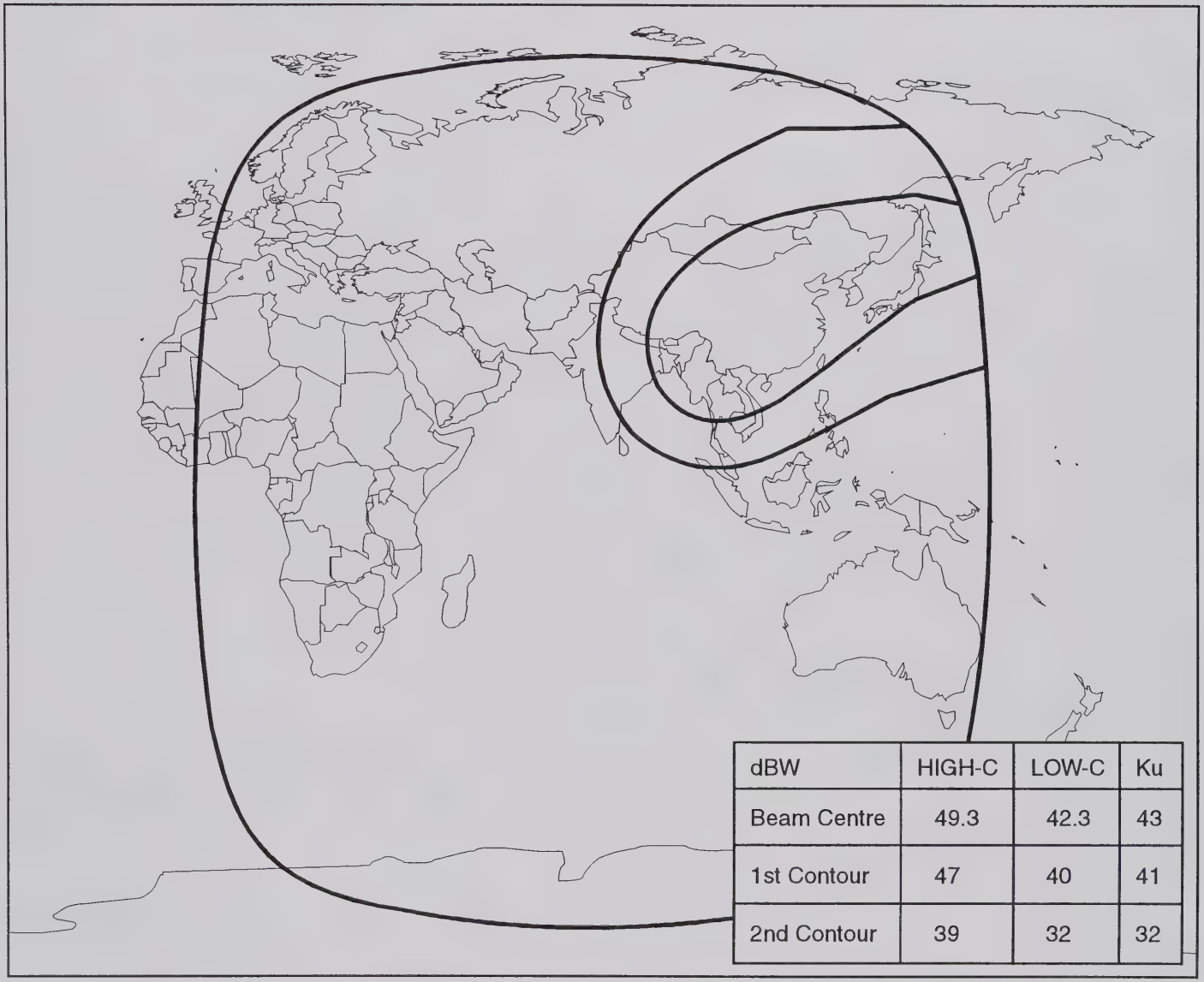


dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
2nd Contour	39	32	32

SPOT BEAMS

RIMSAT

EURASIA EXPRESS (70°-80°E)

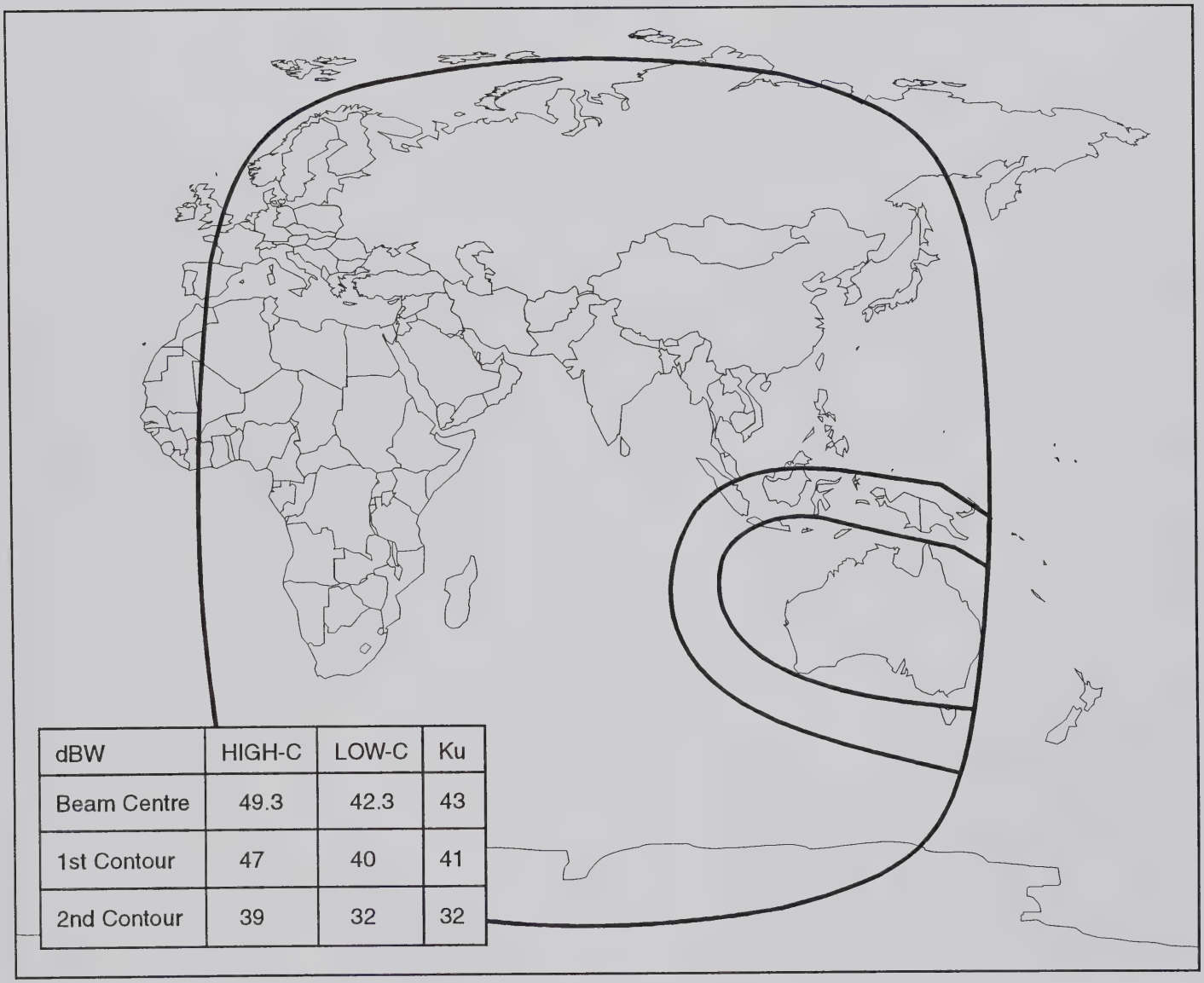


dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
2nd Contour	39	32	32

SPOT BEAMS

RIMSAT

EURASIA EXPRESS (70°-80°E)



dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
2nd Contour	39	32	32

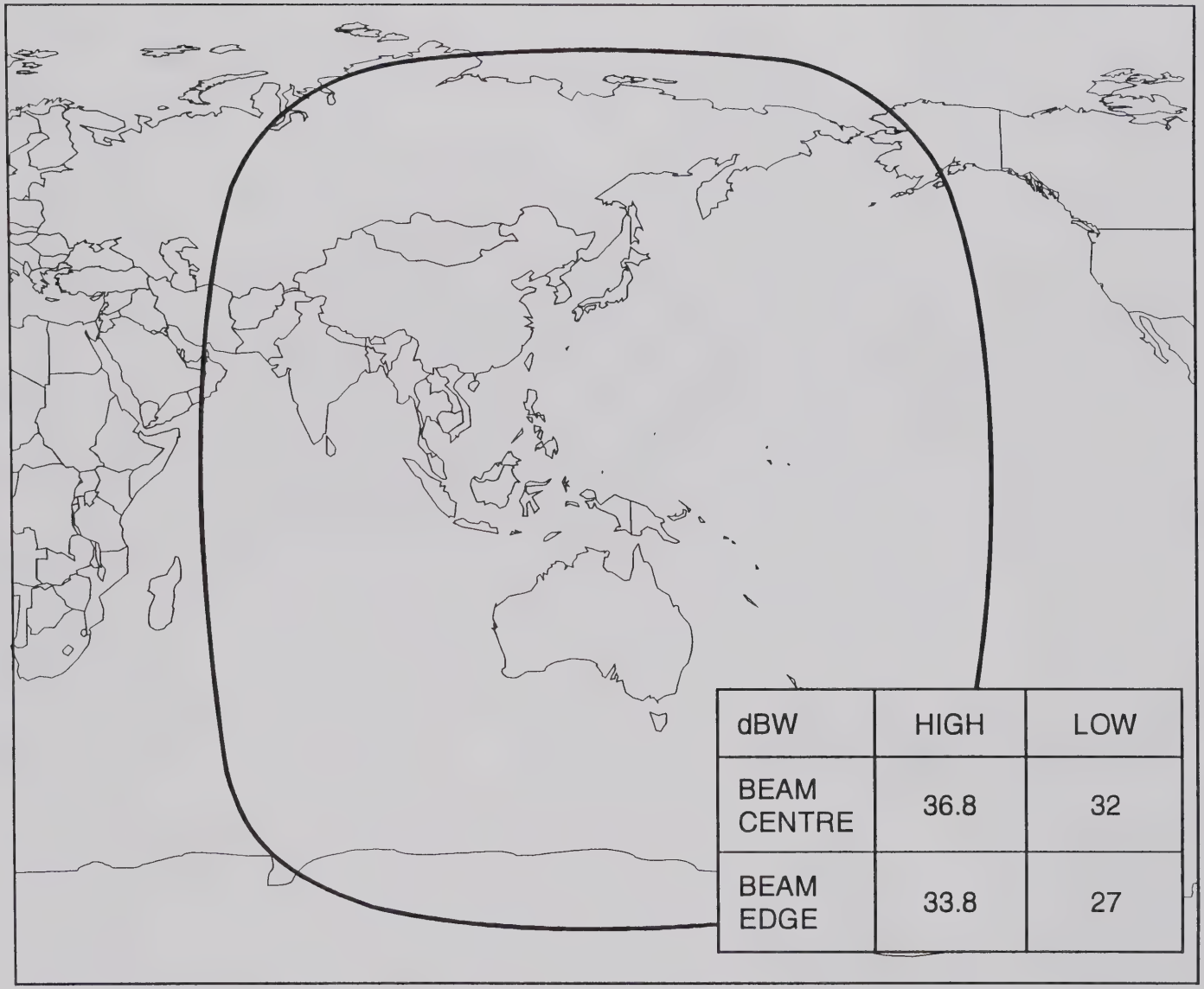
SPOT BEAMS

RIMSAT ASIA PACIFIC EXPRESS

FOOTPRINTS

(130-142.5°E)

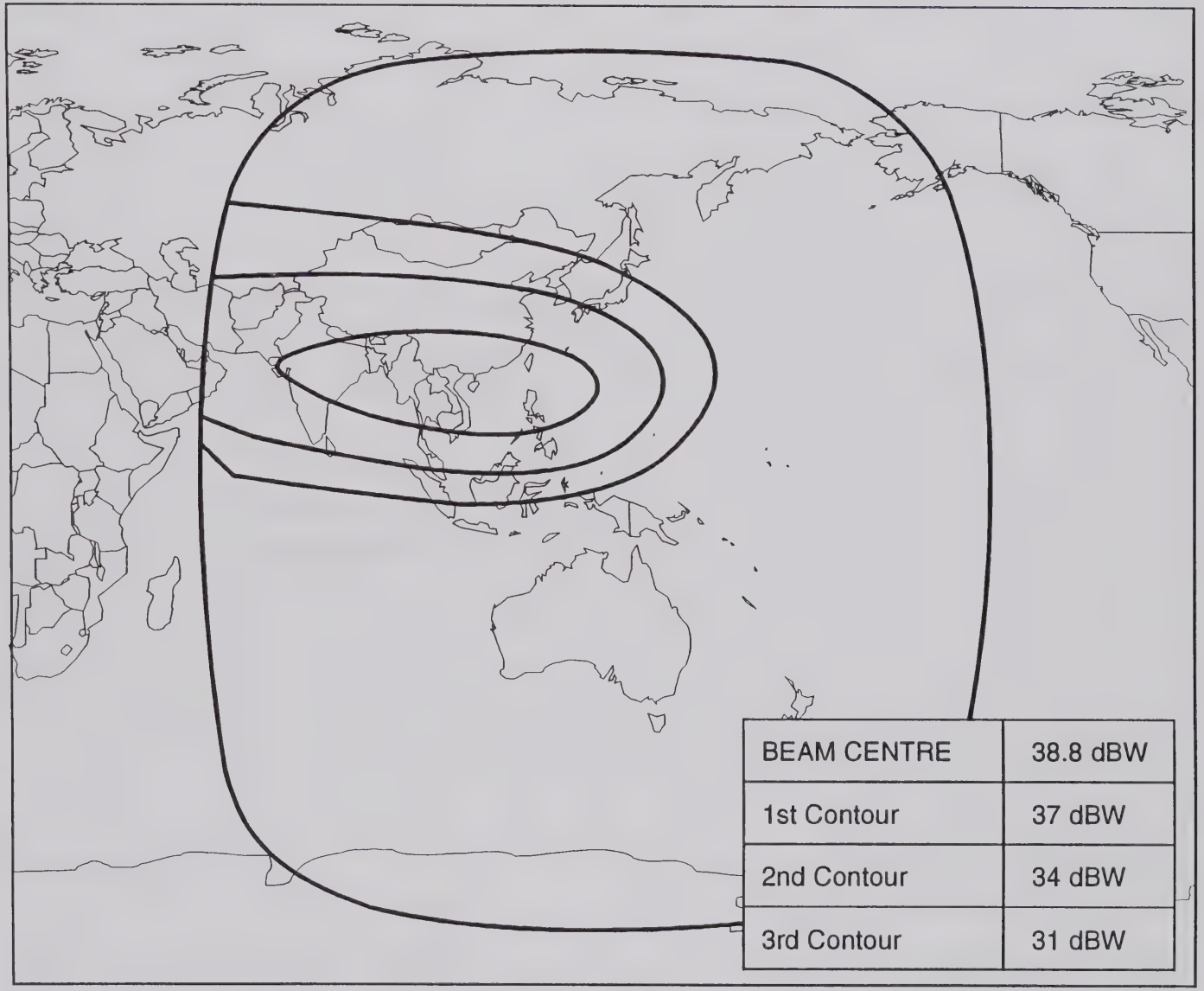
ASIA-PACIFIC EXPRESS (134°E)



dBW	HIGH	LOW
BEAM CENTRE	36.8	32
BEAM EDGE	33.8	27

GLOBAL BEAM

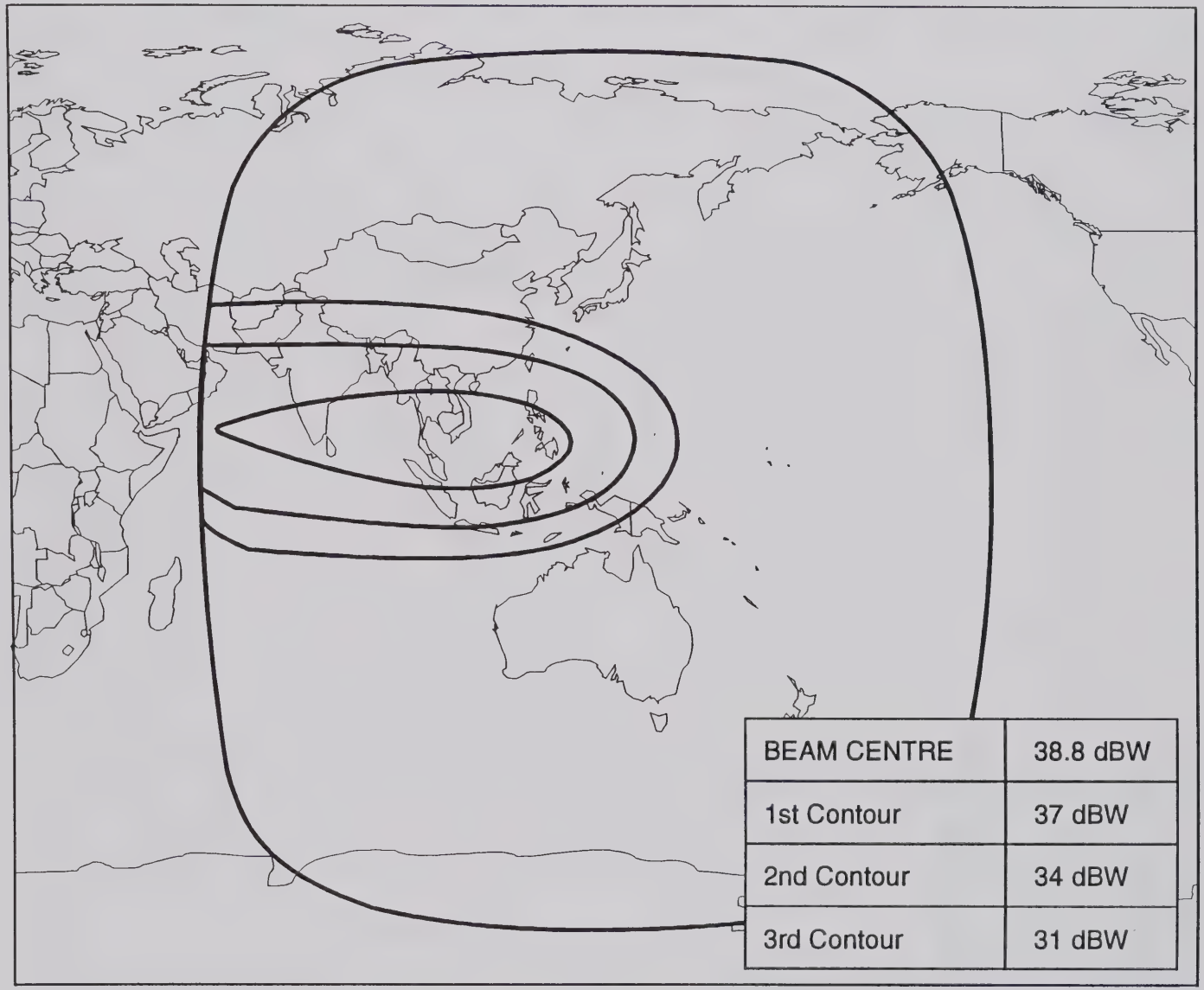
ASIA-PACIFIC EXPRESS (134°E)



BEAM CENTRE	38.8 dBW
1st Contour	37 dBW
2nd Contour	34 dBW
3rd Contour	31 dBW

ZONE BEAM

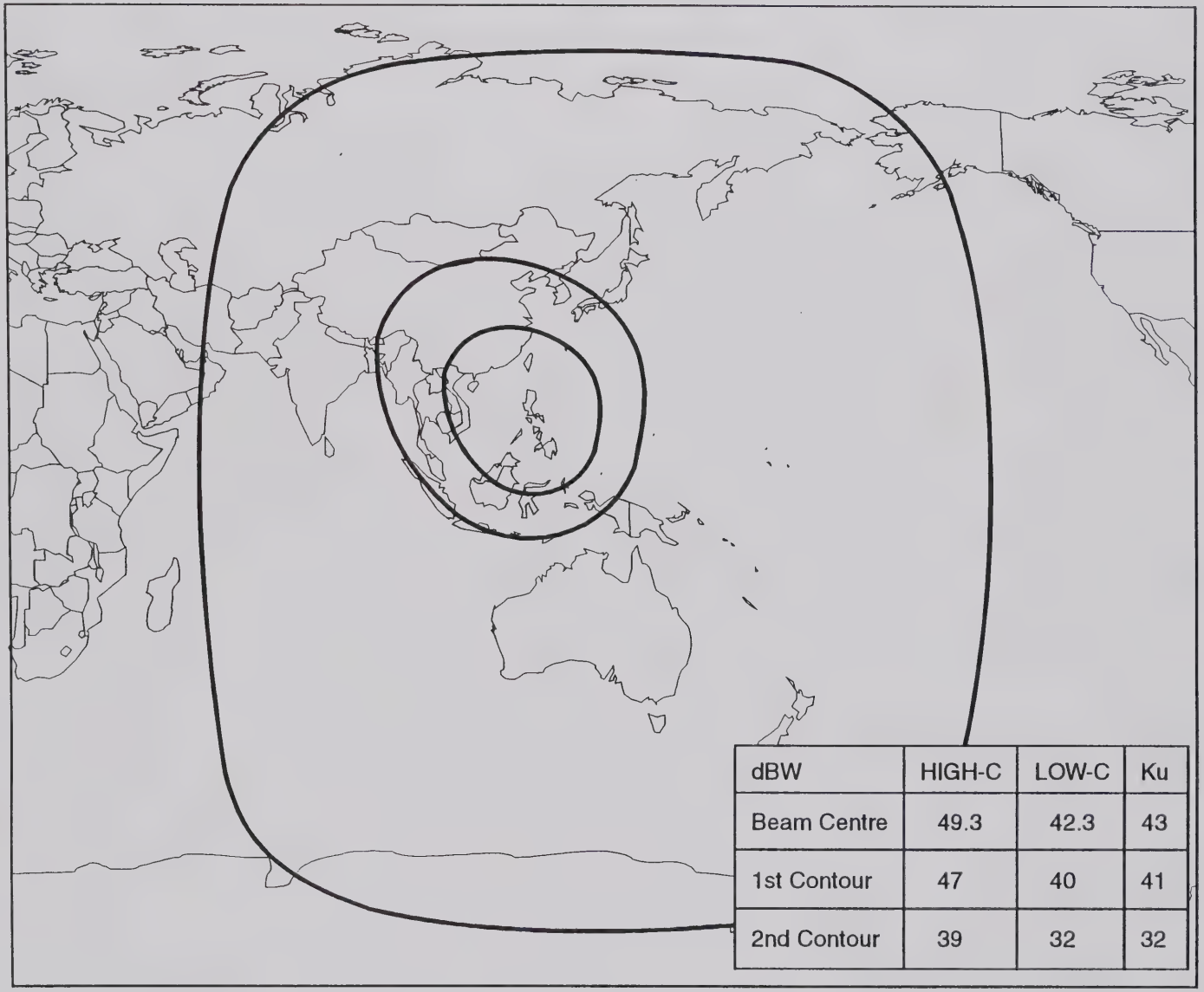
ASIA-PACIFIC EXPRESS (134°E)



ZONE BEAM

RIMSAT

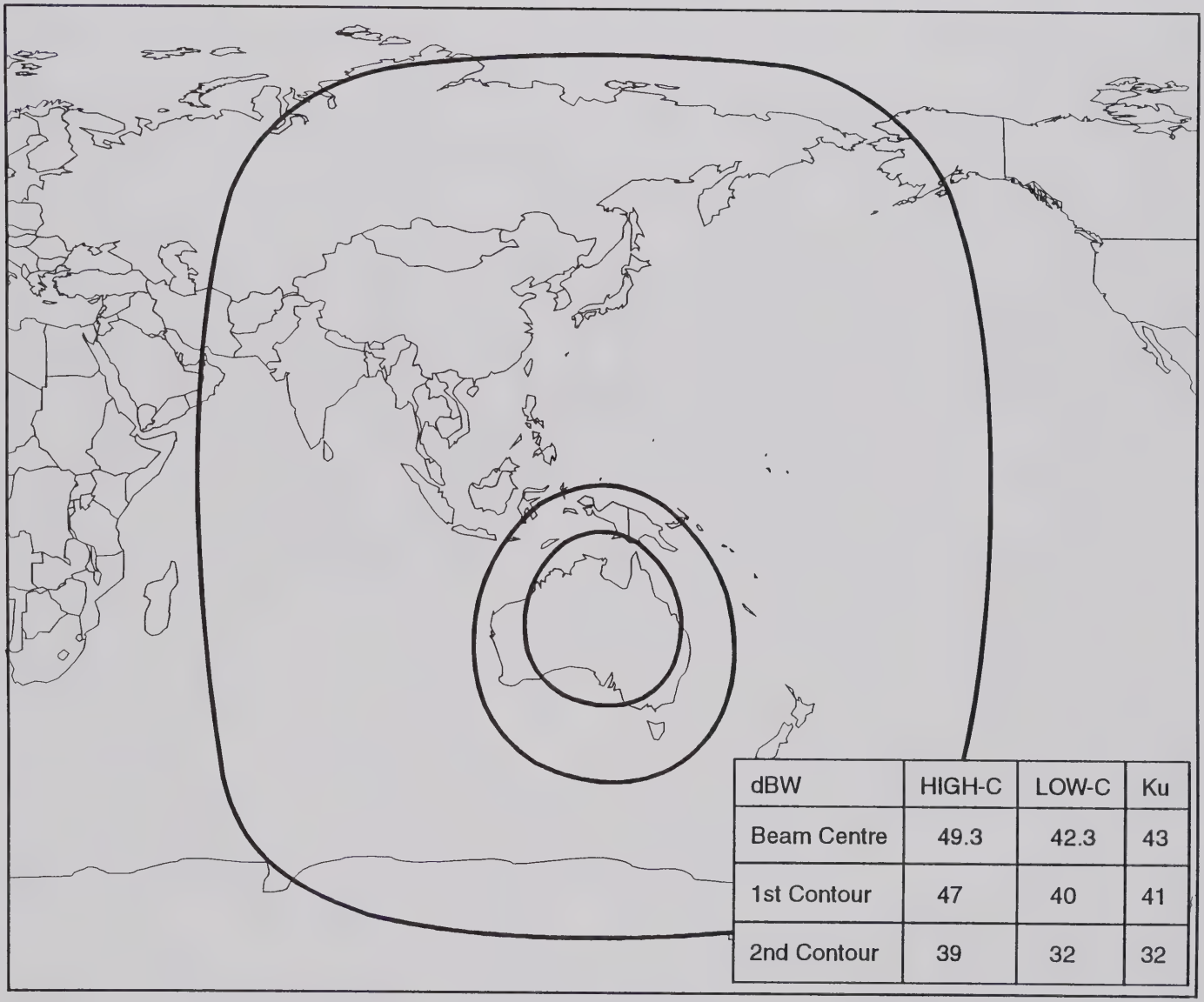
ASIA-PACIFIC EXPRESS (134°E)



dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
2nd Contour	39	32	32

SPOT BEAMS

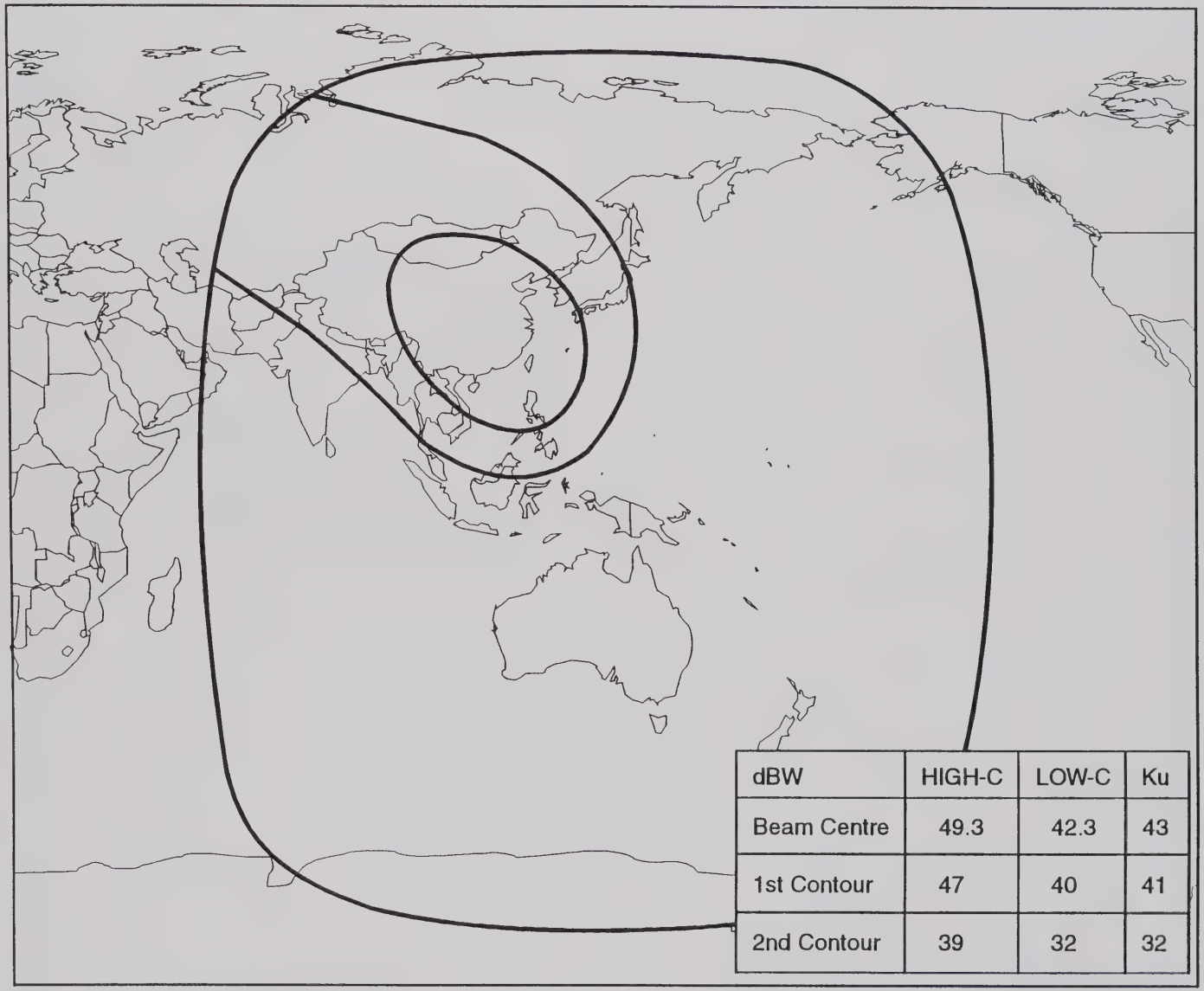
ASIA-PACIFIC EXPRESS (134°E)



dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
2nd Contour	39	32	32

SPOT BEAMS

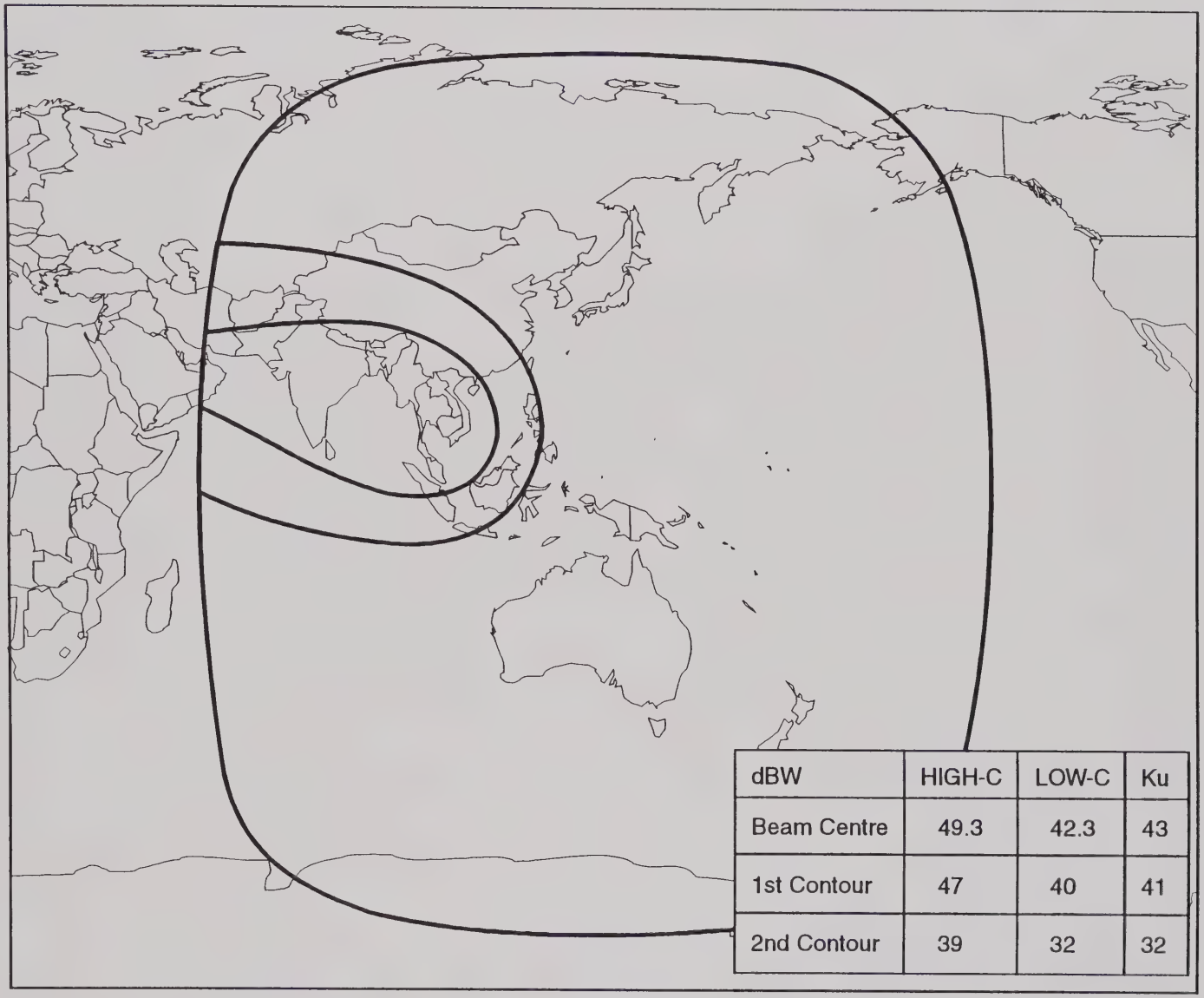
ASIA-PACIFIC EXPRESS (134°E)



dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
2nd Contour	39	32	32

SPOT BEAMS

ASIA-PACIFIC EXPRESS (134°E)

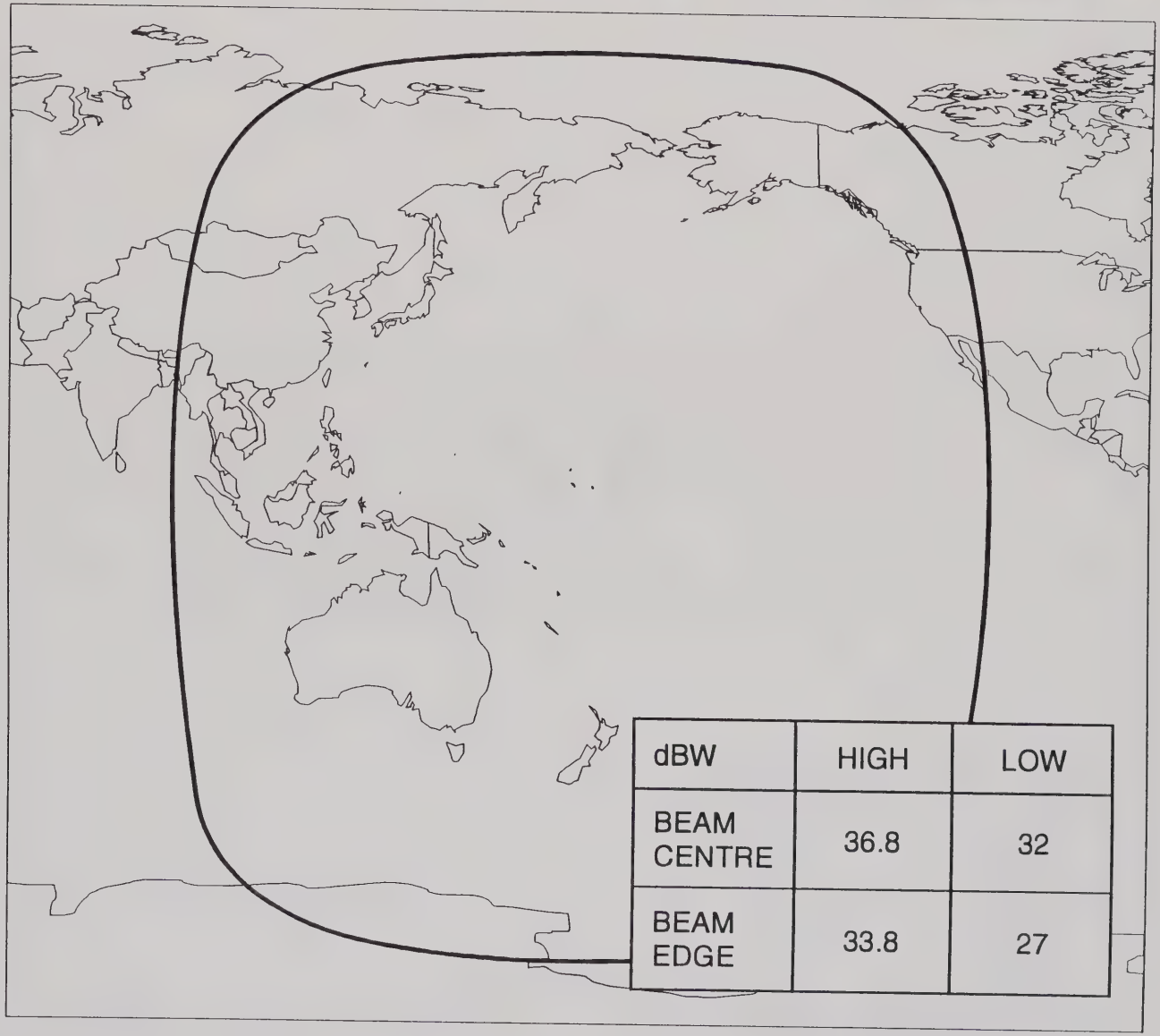


dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
2nd Contour	39	32	32

SPOT BEAMS

RIMSAT

PACIFIC EXPRESS (170.75°E)

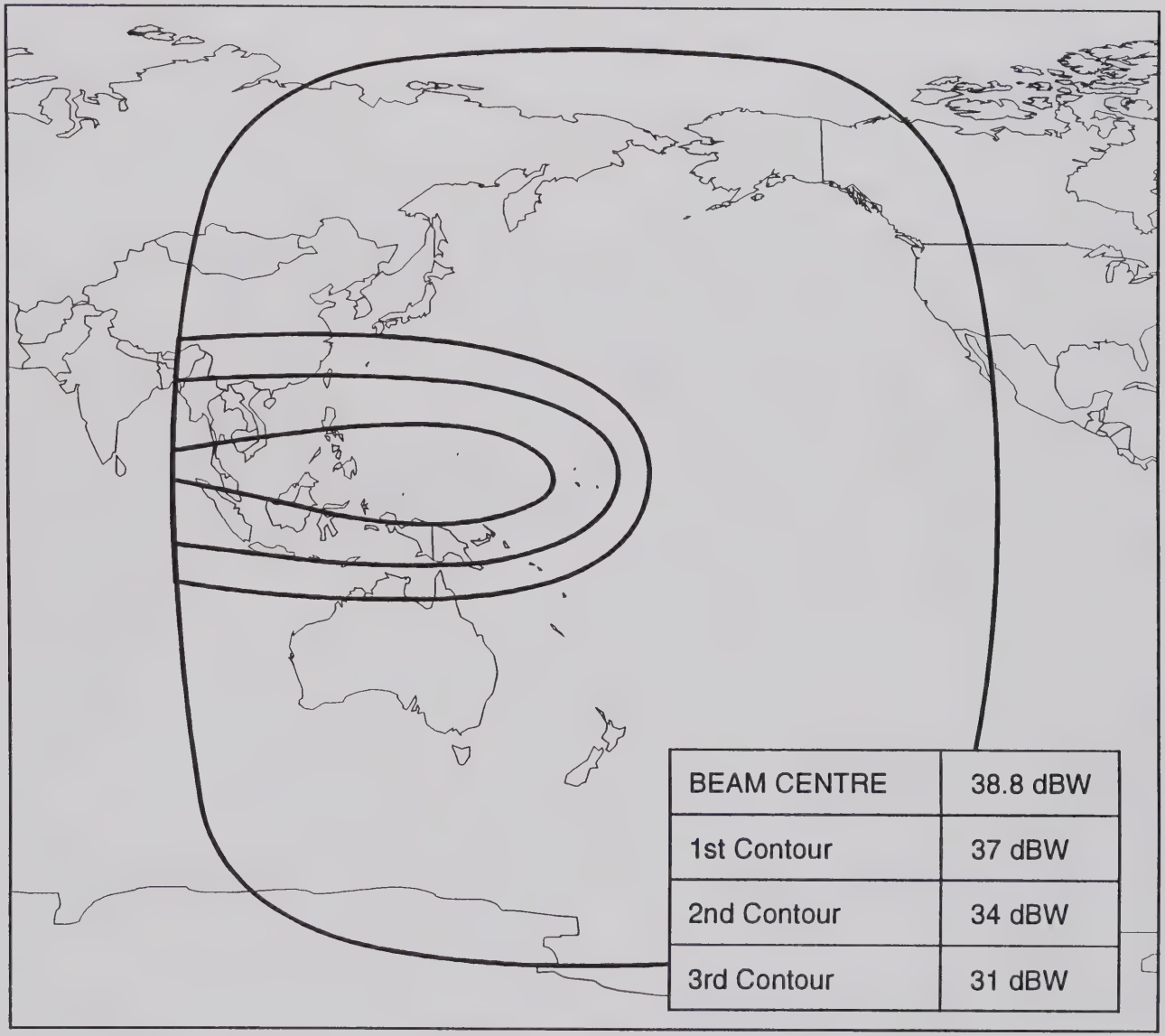


dBW	HIGH	LOW
BEAM CENTRE	36.8	32
BEAM EDGE	33.8	27

GLOBAL BEAM

RIMSAT

PACIFIC EXPRESS (170.75°E)

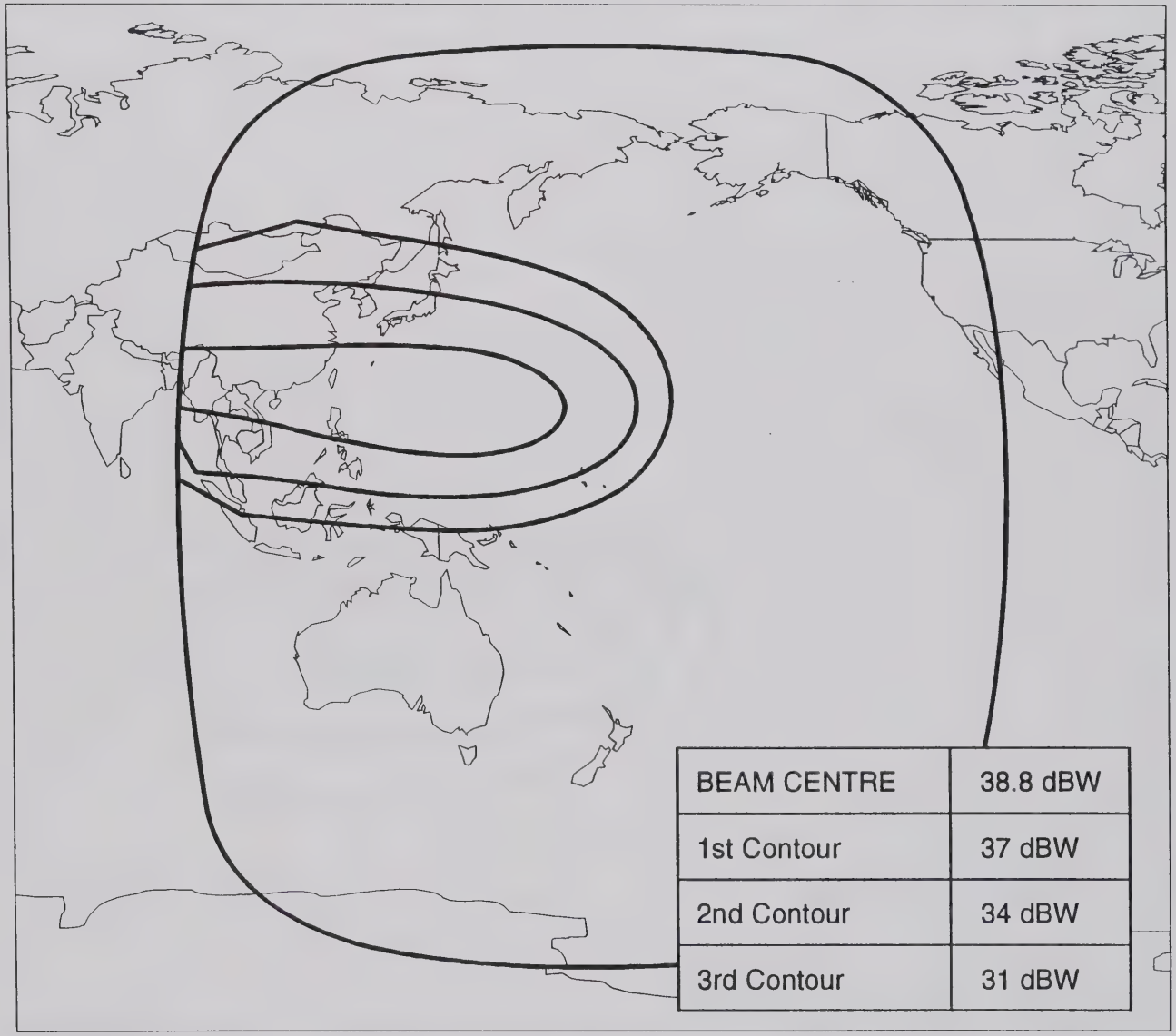


BEAM CENTRE	38.8 dBW
1st Contour	37 dBW
2nd Contour	34 dBW
3rd Contour	31 dBW

ZONE BEAM

RIMSAT

PACIFIC EXPRESS (170.75°E)



BEAM CENTRE	38.8 dBW
1st Contour	37 dBW
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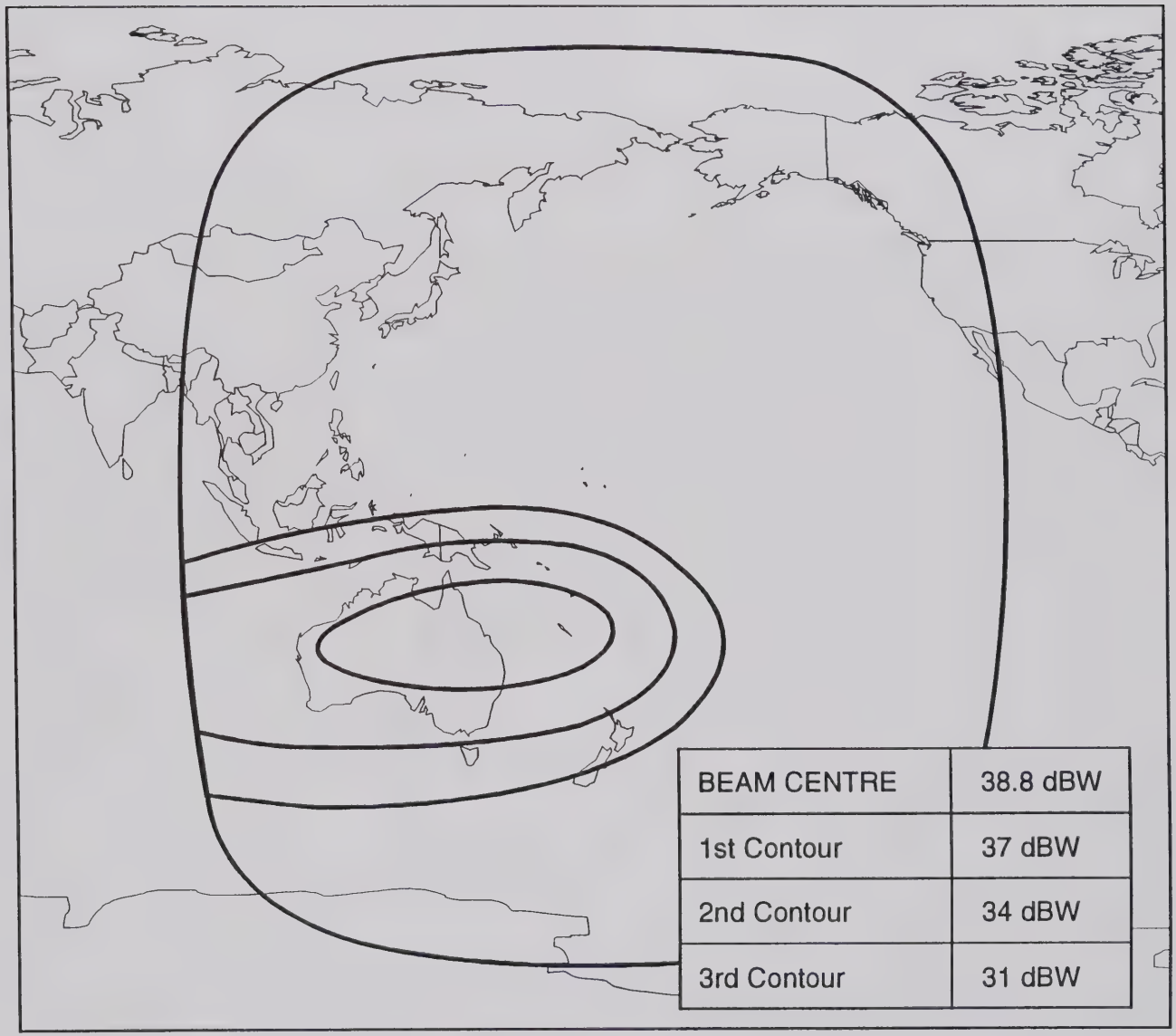
3rd Contour	31 dBW

ZONE BEAM

PACIFIC EXPRESS (170.75°E)



BEAM CENTRE	38.8 dBW
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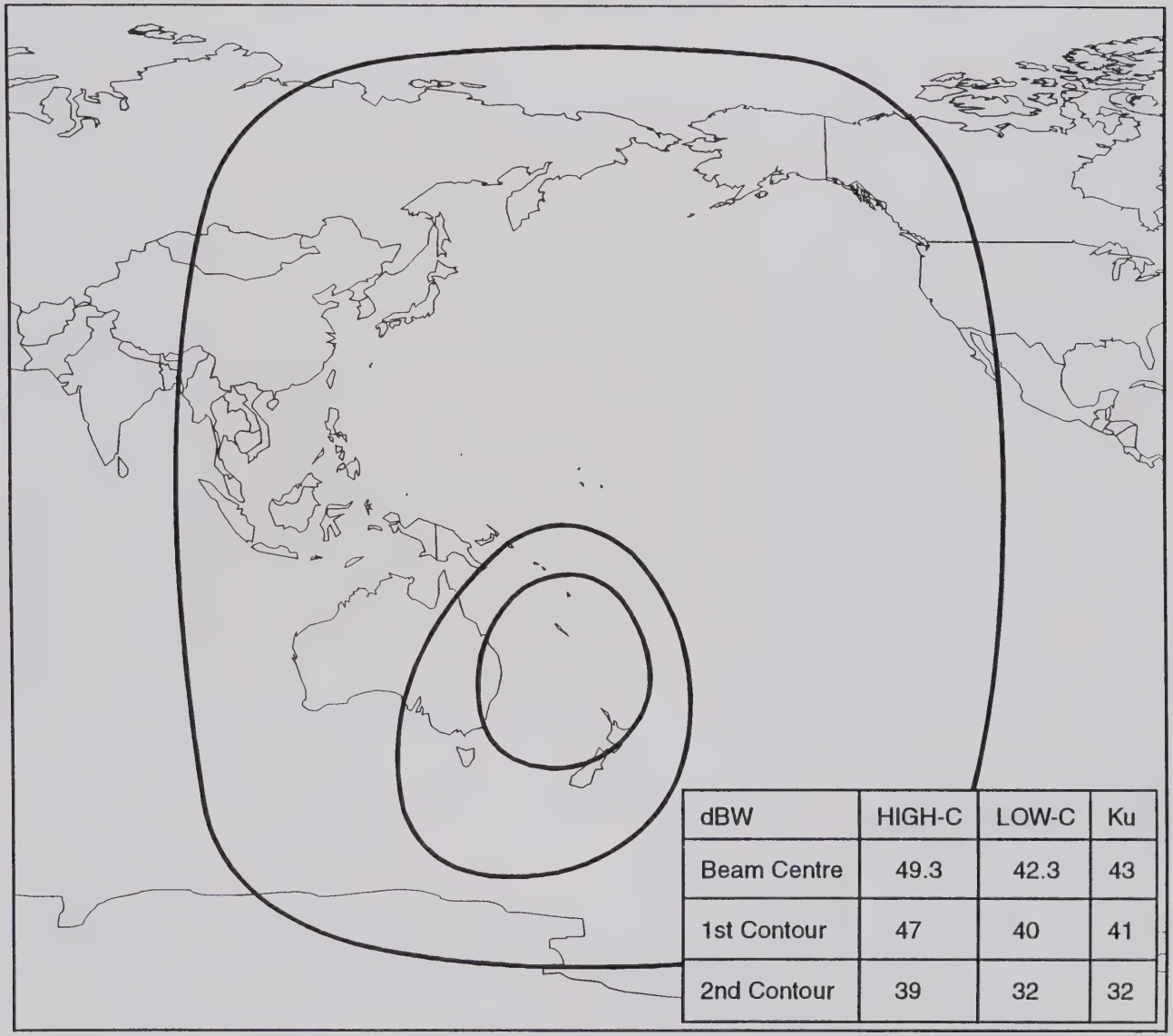
3rd Contour	31 dBW

ZONE BEAM

PACIFIC EXPRESS (170.75°E)



dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
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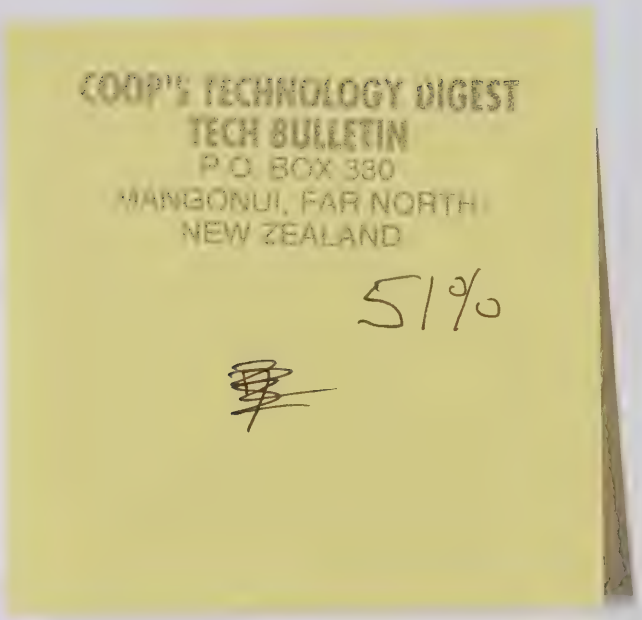
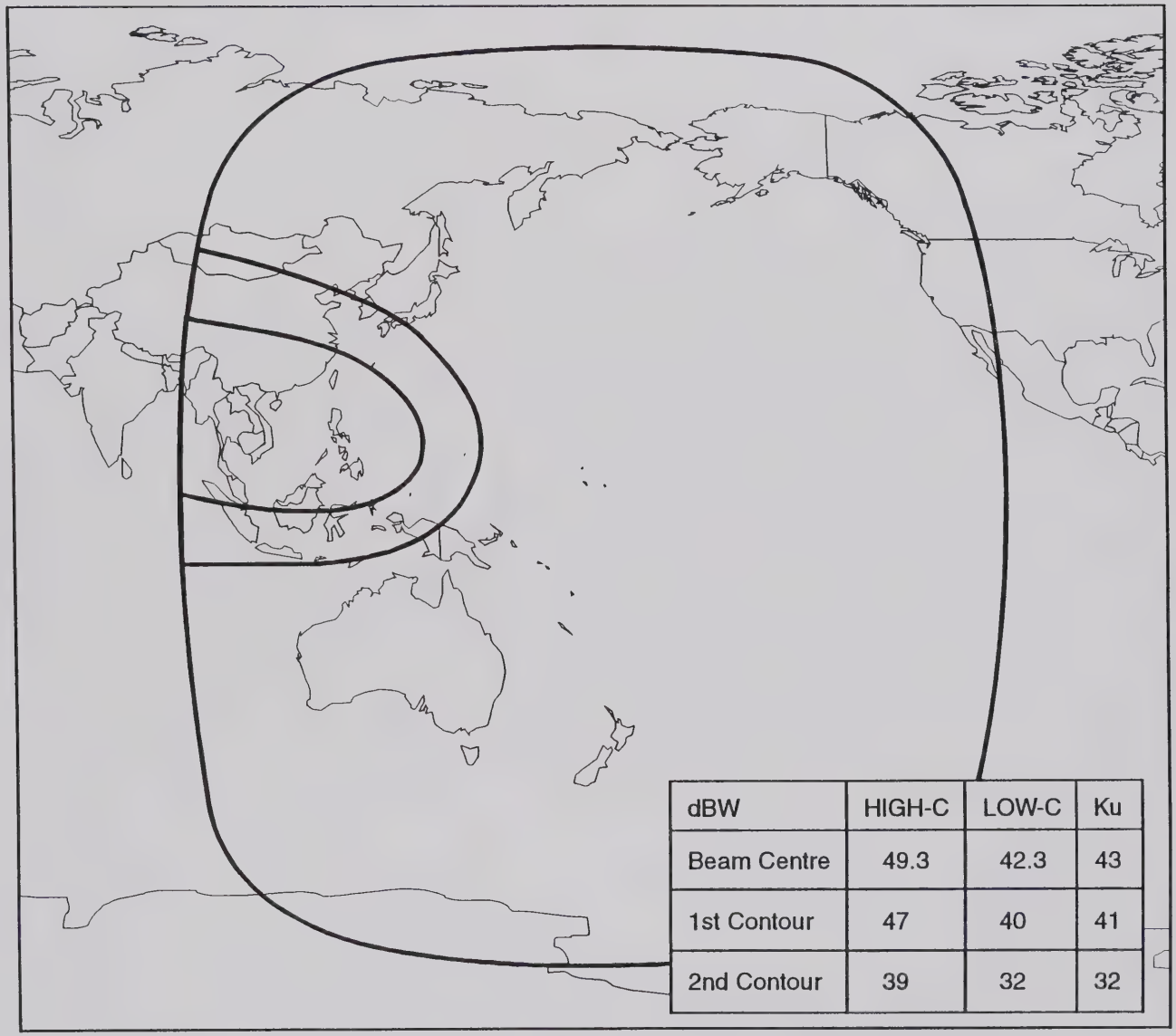
SPOT BEAMS


COOP'S TECHNOLOGY DIGEST
TECH BULLETIN
P.O. BOX 330
MANGONUI, FAR NORTH
NEW ZEALAND
51%

PACIFIC EXPRESS (170.75°E)



dBW	HIGH-C	LOW-C	Ku
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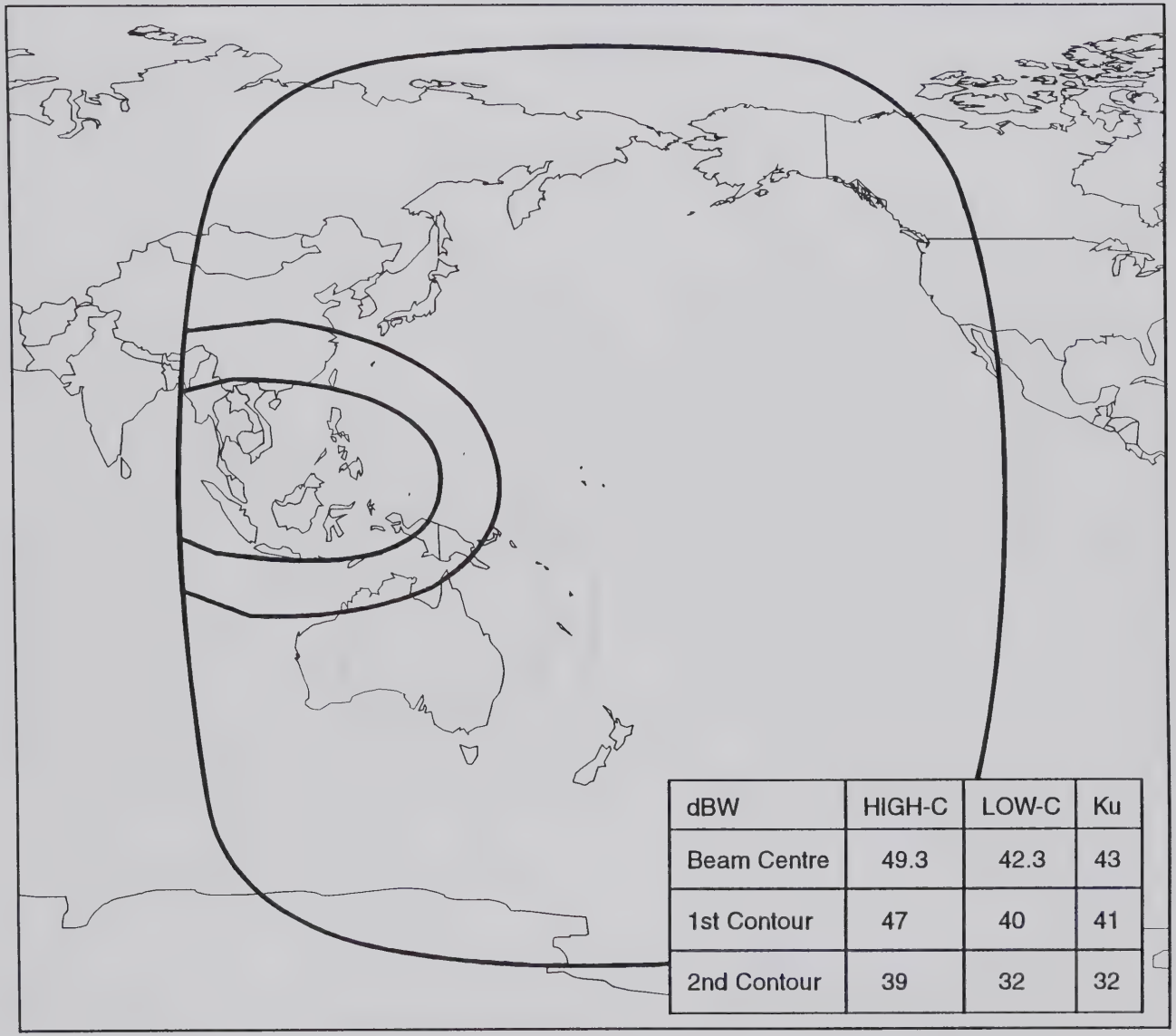
1st Contour	47	40	41
2nd Contour	39	32	32

SPOT BEAMS

RIMSAT

PACIFIC EXPRESS (170.75°E)



dBW	HIGH-C	LOW-C	Ku
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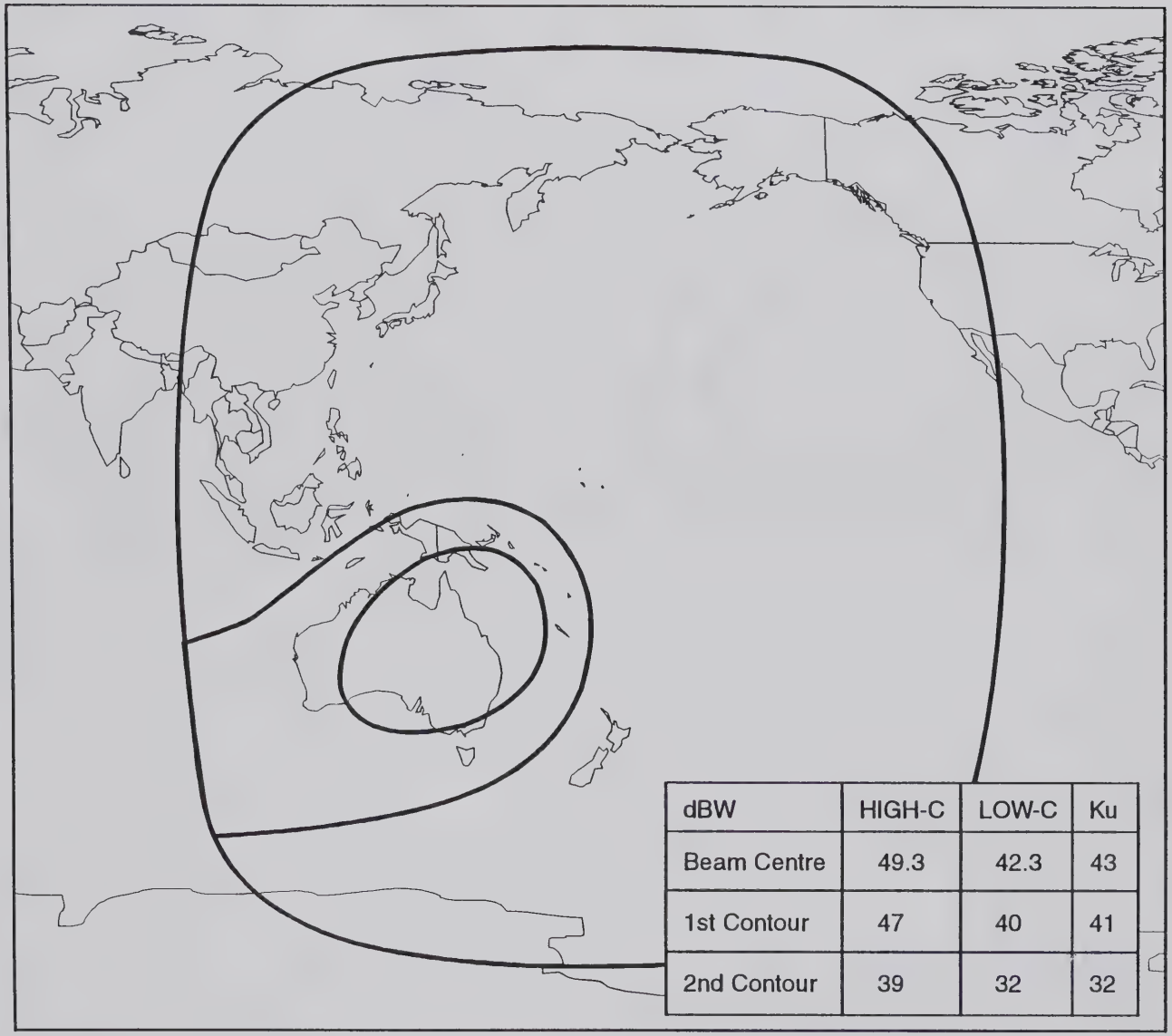
SPOT BEAMS

RIMSAT

PACIFIC EXPRESS (170.75°E)



dBW	HIGH-C	LOW-C	Ku
Beam Centre	49.3	42.3	43
1st Contour	47	40	41
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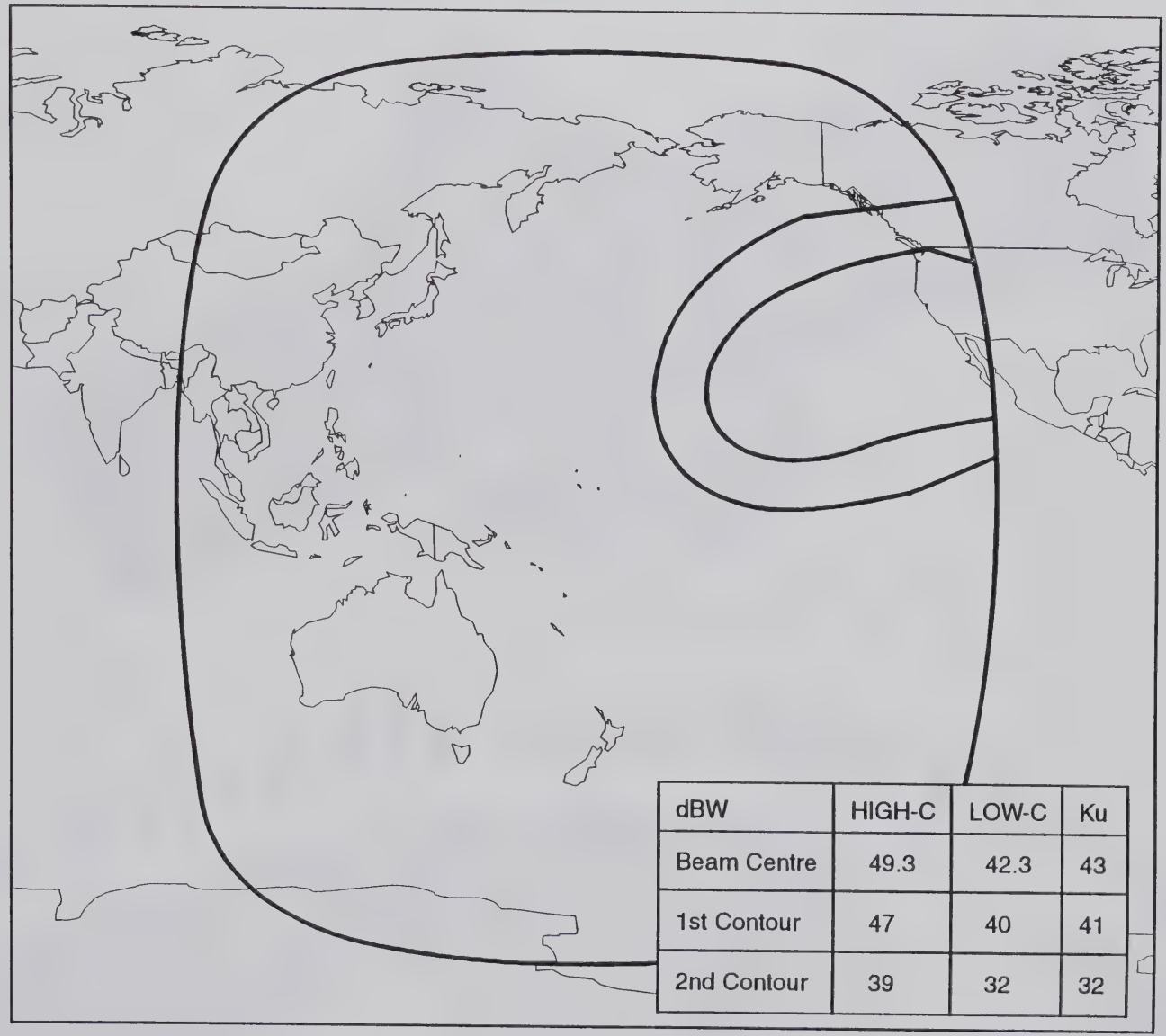
SPOT BEAMS

PACIFIC EXPRESS (170.75°E)



dBW	HIGH-C	LOW-C	Ku
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1st Contour	47	40	41
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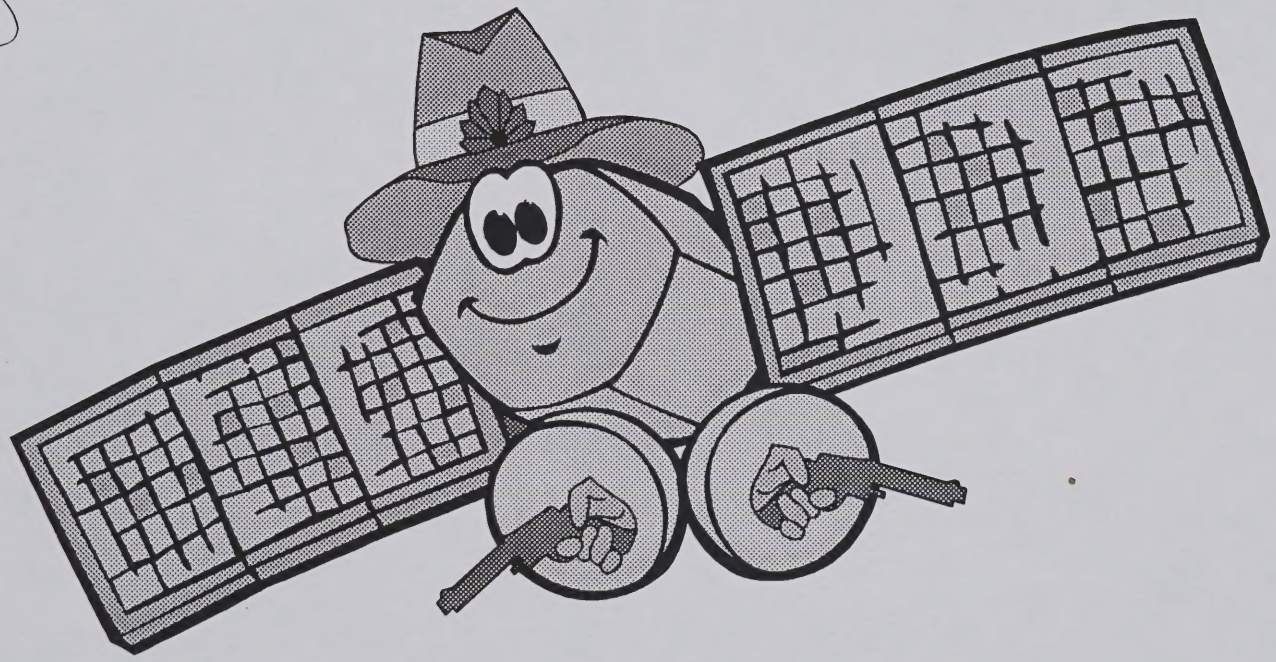
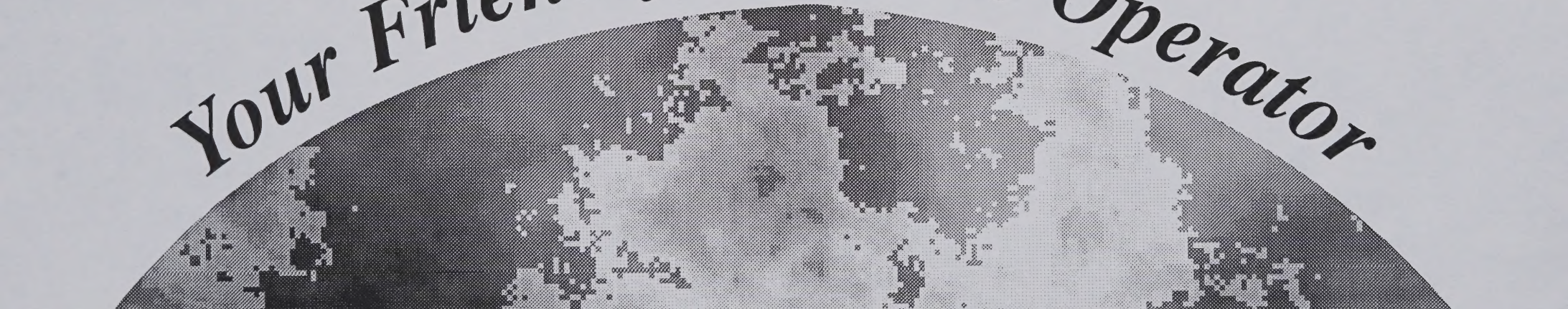
SPOT BEAMS

RIMSAT



Your Friendly Satellite Operator



Тест Elysium Operator 2 Digital